CHAPTER TWO
PURPOSE AND NEED

Consistent with Council on Environmental Quality (CEQ) regulations, Section 1502.13, FAA Order 1050.1E, *Environmental Impact: Policies and Procedures*, June 8, 2004 states:

> This section briefly specifies the underlying purpose and need for the federal action. It presents the problem being addressed… [and] …distinguishes between the need for the proposed action and the desires or preferences of the agency or applicant, and essentially provides the parameters for defining a reasonable range of alternatives to be considered.

This chapter focuses on issues at O'Hare and their effects on the National Airspace System (NAS). This chapter also provides relevant statistical information illustrating the nature of the problem being addressed.

2.1 INTRODUCTION

The physical and operational characteristics of O'Hare contribute to high levels of congestion and delay that are expected to become more severe over the forecast period. Continuing growth in air traffic, congestion and delay at O'Hare in turn affects the efficiency of the entire NAS. Over the years, in response to these problems at O'Hare, the FAA has initiated a series of programs to enhance the capacity and efficiency of the NAS and reduce O'Hare delays.

2.1.1 National Airspace System

The FAA is responsible for the safe and efficient operation of the NAS. As described in FAA's Operational Evolution Plan (OEP), the NAS is defined as:

> a large, complex system that includes: air traffic control systems and equipment; more than 18,000 airports and 750 control facilities; the people who operate the system such as controllers and maintenance technicians; the people who use the system such as pilots, airlines and the flying public; about 45,000 pieces of equipment and many detailed procedures and levels of certification.[1]

2.1.2 Overview of Aircraft Delay

By definition, delay is not desirable. Ideally, transportation systems would function without delay, but it is seldom possible to develop or maintain any system that is completely free of congestion and resultant delay. In practice, the acceptability of delay for passengers, airport operators, and airlines is influenced by the costs of delay compared to the costs and feasibility of measures to reduce or eliminate delay. A number of factors unique to an individual facility contribute to the costs of delay and its remedies. Factors that typically influence acceptable delay levels at an airport include: (1) individual airline operating costs, (2) the effect of an individual airport's delay on other airports throughout the NAS, and (3) the costs of delay

[1] National Airspace System Operational Evolution Plan 2004-2014, FAA, January 2004.

reduction measures. Because these factors are used for various purposes, a single unit of measurable delay that can be used for all purposes does not exist.

Aircraft delay is typically reported in terms of total delay time per airport, number and percentage of flights delayed, and average delay per operation. **Table 2-1** shows a variety of delay measures the FAA uses for different purposes. **Table 2-1** also demonstrates that O'Hare ranks as one of the most delay prone airports in the NAS using any of the delay metrics listed. For airport capacity/delay studies the most commonly used measure of delay is the average annual delay per operation. The FAA uses this metric because it provides a single number for comparison of alternative delay reduction measures and most nearly reflects the economic costs of delay to users. The Total Airspace and Airport Modeller (TAAM) and the Aviation System Performance Metrics (ASPM) can both provide estimates of average annual delay per operation. However, TAAM is a planning tool used to model existing or future conditions yielding estimates of existing delays or future delays, whereas ASPM estimates actual historical delays. The EIS uses both of these planning tools to examine the delays at O'Hare.

As noted above, the average annual delay per operation is a single number that is useful for comparing alternative delay reduction techniques. But, because it averages delays over the course of a year, this metric can mask periodic fluctuations affecting the efficiency of individual airport's effect on the NAS (i.e. adverse weather, etc.).

2.1.3 Congestion and Delay in the NAS

This section presents FAA data on delays throughout the NAS highlighting that O'Hare is the most significant contributing factor in delays. The sources utilized in this section are OPSNET and ASPM. TAAM delays are presented for O'Hare in **Section 2.1.6.1, Simulated Airfield Delay at O'Hare.**

2.1.3.1 OPSNET Delay Reporting

Table 2-2 shows the top 20 airports delayed, as measured in total minutes of delay, for the calendar years 2002 and 2003 according to FAA OPSNET. As measured by OPSNET, the total minutes of delay at the top 20 airports increased by 1,770,514 minutes, or 16.9 percent between 2002 and 2003. O'Hare had the greatest share of minutes of delay for the top 20 airports in the NAS with 27.5 percent in 2002 and 31.4 percent in 2003. O'Hare operations were delayed a total of 2,875,328 minutes in 2002 and 3,840,493 minutes in 2003. In 2002, 53,156 operations at O'Hare were significantly delayed (i.e. more than 15 minutes); in 2003, 69,185 operations were significantly delayed.

TABLE 2-1
DELAY METRICS AND DATA SOURCES

Source	Description of How Delay is Measured	Purpose of Delay Measurement	Delays at O'Hare
Operations Network (OPSNET) (a)	OPSNET measures delay during any phase of flight as the aircraft passes through each Air Route Traffic Control Center (ARTCC). An aircraft is counted as delayed if it experiences a delay of 15 minutes or more during its passage through each ARTCC. This source does not provide data for aircraft delayed less than 15 minutes.	Monitoring and managing Air Traffic Control Resources	Delayed operations per 1,000 operations = 57.6 (Rank = First worst) Total delayed operations = 53,156 (Rank = First worst)
Airline Service Quality Performance (ASQP) (b)	ASQP is the Department of Transportation's (DOT's) reporting system that tracks air carrier domestic flight information of 19 commercial carriers. Flights are counted as delayed when they do not push back from the departure gate within 15 minutes of scheduled departure time, or if they do not arrive at the arrival gate with 15 minutes of the scheduled arrival.	Provides traveling public with information about on-time performance of specific airlines, airports, and specific flights and routes that consistently perform poorly.	Flight arrivals – Percent on time = 82.2 percent (Rank =Fifth worst) Flight departures – Percent on time = 85.7 percent (Rank =Fifth worst)
Aviation System Performance Metrics (ASPM) (c)	Two types of average arrival and average departure delay are reported directly by ASPM as measures of on-time performance. Actual flight times are compared with either (1) airline flight plans filed with the FAA, or (2) airline schedules from the Official Airline Guide (OAG) and carrier reservation systems. In addition, the user can calculate the average arrival and departure delays as "excess travel time" delay by combining delays incurred by aircraft in different phases of flight.	To provide metrics comparing actual versus scheduled or planned performance by the phase of a flight.	Average delay calculated as Excess Travel Time in minutes/operation = 11.8 (Rank = Fifth worst)
Total Airspace and Airport Modeler (TAAM) (d)	TAAM is a sophisticated computer simulation tool that can simulate traffic at a very detailed level-from the gate of one airport to the gate at another airport. TAAM was used for this EIS to analyze the operating characteristics for the existing airfield and proposed airfield improvements.	Planning tool for airports	Estimated total average annual delay in minutes/operation = 9.3

Notes: (a) OPSNET delays shown for CY 2002.
(b) ASQP delays shown for 12 months ending November 2002 as reported in November 2002 DOT Air Travel Consumer Report.
(c) ASPM delay shown for CY 2002.
(d) TAAM delay was calculated as the weighted average delay of the runway operating configurations for CY 2002. TAAM is similar to other airfield capacity/demand/delay models such as SIMMOD, ADSIM, RDSIM, and the Runway Capacity/Annual Delay Models in that the time required for the operation is compared to the unimpeded time to result in an estimate of delay. In general, delays from all of these techniques are comparable, although they have differing sensitivities to the various components of delay. The results of these models are generally similar, but not directly comparable to the ASPM data comparing actual to planned flight time.

Source: Federal Aviation Administration.
Ricondo and Associates, Inc. [CCT] Preliminary Draft TAAM Simulation Data for Noise and Air Quality Analysis – [Existing Airfield 2002], January 2004.

TABLE 2-2
AIRPORT DELAYS AT THE NATION'S MOST DELAYED AIRPORTS AS MEASURED IN TOTAL MINUTES OF DELAY

2002					2003				
Facility	Total Operations	Total Delays	Total Delay Time (Min)	% of Delays of Top 20 Airports	Facility	Total Operations	Total Delays	Total Delay Time (Min)	% of Delays of Top 20 Airports
ORD	922,787	53,156	2,875,328	27.5%	ORD	931,422	69,185	3,840,493	31.4%
ATL	890,923	29,821	1,307,943	12.5%	ATL	911,788	37,520	1,542,601	12.6%
LGA	367,656	12,635	773,267	7.4%	EWR	410,661	24,649	1,443,001	11.8%
EWR	411,239	13,836	770,931	7.4%	LGA	379,369	17,898	952,656	7.8%
PHL	467,717	16,425	645,867	6.2%	PHL	445,974	13,627	603,221	4.9%
DFW	777,386	18,710	615,231	5.9%	IAH	479,080	15,989	478,642	3.9%
IAH	462,255	19,123	553,110	5.3%	SFO	334,507	9,310	400,612	3.3%
SFO	351,453	12,396	494,269	4.7%	DFW	775,900	9,423	354,225	2.9%
MSP	507,322	8,733	345,019	3.3%	IAD	365,766	5,845	310,867	2.5%
STL	451,804	6,977	325,093	3.1%	PHX	591,092	11,800	298,069	2.4%
JFK	301,160	7,591	265,028	2.5%	MSP	508,162	7,333	266,746	2.2%
PHX	590,329	8,700	232,829	2.2%	LAS	502,395	6,697	255,267	2.1%
CVG	485,156	6,646	220,142	2.1%	CVG	505,557	6,980	251,482	2.1%
DTW	497,564	6,432	214,977	2.1%	MDW	328,416	4,994	237,822	1.9%
IAD	392,179	3,900	188,040	1.8%	STL	394,463	4,788	203,565	1.7%
BOS	404,649	4,313	175,494	1.7%	JFK	291,299	6,085	190,850	1.6%
MDW	303,837	2,977	130,168	1.2%	BOS	379,439	3,852	176,199	1.4%
LAX	644,854	3,410	120,300	1.1%	DTW	492,011	4,842	154,081	1.3%
LAS	498,037	3,631	110,912	1.1%	FLL	287,870	3,893	150,189	1.2%
MIA	445,635	3,833	101,681	1.0%	MIA	411,489	4,864	125,555	1.0%
Total			**10,465,629**	**100.0%**	**Total**			**12,236,143**	**100.0%**

Source: FAA OPSNET, November 2004.

2.1.3.2 ASPM Delay Reporting

"Delays at O'Hare can cause significant disruption to the efficiency of the NAS and substantial inconvenience to the traveling public."[2] For example, when congestion due to adverse weather or other conditions at O'Hare reduces its arrival capacity, the FAA imposes flow control to hold aircraft destined for O'Hare at airports across the country. One measure of flow control delay[3] is reflected in the expected departure clearance time (EDCT). When O'Hare experiences congestion and delay, departure clearances for O'Hare-bound aircraft at upstream airports may be delayed. In 2002, O'Hare-bound aircraft incurred over 1,920,000 minutes (32,000 hours) of

[2] FAA Order Limiting Scheduled Operations, Docket FAA-2004-16944, January 2004.

[3] Flow control delays refer to the flights being held at their origin airport past their scheduled departure for O'Hare due to congestion on the airfield at O'Hare.

EDCT delay at other airports; and in 2003, O'Hare-bound aircraft incurred over 3,360,000 minutes (56,000 hours) of EDCT delay at other airports.[4]

Table 2-3 shows an examination of Aviation System Performance Metrics (ASPM) data for the top 10 airports considered in the OEP for calendar years 1998 – 2003. The ASPM delays for all 35 airports considered in the OEP are contained in **Appendix A**, **Background. Table 2-3** shows that the annual average delay calculated as excess travel time[5] at O'Hare was 11.8 minutes in 2002 and 14.9 minutes in 2003.

TABLE 2-3
ASPM DATA FOR 10 AIRPORTS IN FAA OEP FOR 1998-2003

	Average Delay Calculated as Excess Travel Time (minutes per operation)					
Airport Code	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**
EWR	17.4	19.6	18.7	16.4	12.5	16.8
PHL	11.8	13.5	15.3	14.6	13.3	15.1
ORD	**10.8**	**13.2**	**15.4**	**13.4**	**11.8**	**14.9**
LGA	12.1	15.8	23.8	17.0	13.0	14.8
ATL	12.5	13.6	14.0	12.3	12.7	13.5
JFK	11.0	12.2	13.6	12.8	10.4	11.1
MSP	11.3	11.2	11.5	11.1	10.8	10.2
MDW	8.1	9.1	10.7	8.8	9.5	9.6
IAD	8.3	10.0	10.4	8.9	8.1	9.6
DFW	9.1	10.0	11.7	11.1	9.8	9.4

Source: Leigh Fisher Associates [TPC] Analysis, FAA ASPM Data, November 2004.

2.1.4 Characteristics of Airports within the Chicago Airport System

Multiple airport systems are a feature of nearly all metropolitan areas that generate high levels of originating traffic.[6] The definition of a multi-airport system is that set of significant airports that serve commercial transport in a metropolitan region without regard to ownership or political control of the individual airports.[7] The Chicago Airport System, as defined by the City of Chicago Department of Aviation, consists of O'Hare and Midway. However, a number of other commercial service airports, including Milwaukee's General Mitchell International Airport, Northwest Chicagoland Regional Airport at Rockford, and Gary/Chicago International Airport, serve the various air transportation needs of the Chicago region and are therefore part of the multi-airport system. Each of these commercial service airports serves a distinct role as described in **Section 1.3.2**, **Other Airports in the Chicago Airport System.**

4 Leigh Fisher Associates [TPC] analysis of FAA ASPM Data, March 2004.
5 Excess travel time is a value calculated from ASPM data that includes EDCT, airborne, and taxi-in delays incurred by arrivals and gate and taxi-out delays incurred by departures. EDCT delays incurred by departures are not included in this delay metric as these delays are generally associated with down-line capacity constraints not caused by O'Hare International Airport.
6 Airport Systems, Planning, Design, and Management, R. de Neufville and A Odoni, McGraw-Hill 2003, page 134.
7 Airport Systems, Planning, Design, and Management, R. de Neufville and A Odoni, McGraw-Hill 2003, page 132.

2.1.5 Characteristics of O'Hare

O'Hare plays a unique role within the NAS. It is a connecting hub for two of the largest airlines. Also, the Airport serves as an origin and destination for many international flights by both U.S. as well as foreign flag carriers. Given its location, O'Hare is a logical point for significant passenger connections. The FAA has identified specific conditions at O'Hare and in the Chicago airspace affecting the efficiency of air transportation in the NAS. A summary of these conditions follows.

2.1.5.1 Existing Airfield Layout

The runway layout at O'Hare has a major effect on airfield capacity and the resulting levels of delay. This layout consists of three converging and intersecting sets of parallel runways (Runways 14/32, 9/27, and 4/22) as well as one north/south runway (Runway 18/36)[8] as shown in **Exhibit 2-1.** As a result of this existing airfield layout, operations on any pair of parallel runways interact with operations on any other pair of runways. This operational dependency increases the separation required between the aircraft landing and taking off at O'Hare when more than two parallel runways are in use. Furthermore, during adverse weather conditions, these same separation requirements are increased still further. Increased aircraft separation, in turn, reduces the airfield capacity by reducing the rates at which arrivals can land and departures can take off from O'Hare's runways. Finally, in most runway use configurations it is not possible to optimize airfield procedures for simultaneous arrivals and departures.

2.1.5.2 Existing Airspace Issues

Like the airport itself, the volume of airspace surrounding O'Hare is one of the busiest in the world, accommodating arrivals and departures from O'Hare; other Chicago area airports including Chicago Midway International Airport; and en route traffic. The volume of airspace considered in this EIS includes airspace within approximately 50 nautical miles of O'Hare. This airspace is under the control of three FAA air traffic control facilities. The O'Hare Airport Traffic Control Tower (O'Hare Tower) controls the airspace within about 5 nautical miles of O'Hare and manages air traffic on the final stages of approach, while taxiing at the Airport, and along their initial climb from O'Hare. The O'Hare Terminal Radar Approach Control Facility (O'Hare TRACON or C90) is responsible for airspace extending from the area controlled by the O'Hare Tower's area to a distance approximately 40 nautical miles away from O'Hare and beneath an altitude of approximately 13,000 feet. Air traffic controllers at O'Hare TRACON are tasked with separating aircraft arriving to and departing from O'Hare, other Chicago area airports, and aircraft operations that transit O'Hare TRACON airspace en route. Air traffic controllers from the Chicago Air Route Traffic Control Center (ZAU) assume air traffic control responsibilities for airspace beyond and above that controlled by O'Hare TRACON.

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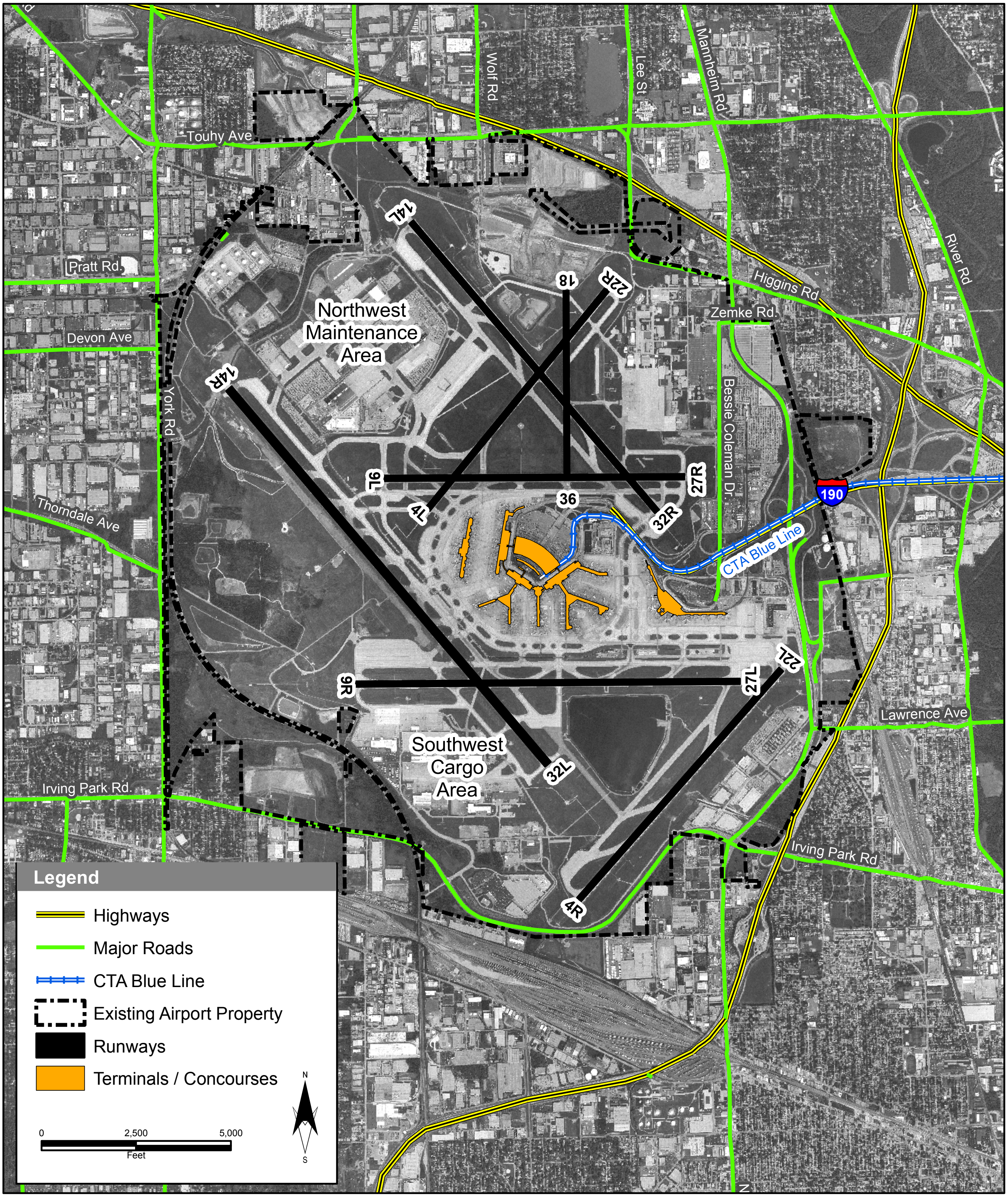
[8] O'Hare north-south runway (18-36) has been permanently closed and therefore is not included in the analysis of airfield capacity and delay.



Source: Aerial Express Photo Dated September, 2002, Existing ALP CAD Layers. Roads: ESRI StreetMap, 2003.

Chicago O'Hare International Airport

O'Hare Modernization Environmental Impact Statement

Chicago O'Hare International Airport (2002)

Exhibit 2-1

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Generally, arrivals to O'Hare transition from ZAU to C90 airspace over one of four "corner-posts" located northwest, northeast, southwest, and southeast of O'Hare.[9] These corner-posts are named for the navigational aids and airspace intersections where they are located and include KRENA to the northwest, KUBBS to the northeast, BEARZ to the southeast, and PLANO to the southwest. Departures from C90 to ZAU airspace through one of four departure "corridors" located east, south, north, and west of O'Hare. Two departure routes—ELX and GIJ—are provided to the east, three departure routes—RBS, GUIDO, and EON—are provided to the south, two departure routes—PLL and MZV—are provided to the west, and two departure routes—BAE and PETTY—are provided to the north.[10]

Exhibit 2-2 shows the generalized airspace route structure.

There are several airspace issues that adversely affect aircraft operations at O'Hare. From the perspective of the EIS, there are two pertinent issues that affect aircraft activity at O'Hare, including the following:

- Airspace congestion to the south and east of O'Hare frequently requires air traffic controllers to impose miles-in-trail (MIT) restrictions between successive southbound and successive eastbound departures, limiting O'Hare departure capacity and causing delays.
- Although capable of serving O'Hare's existing runway configurations, the arrival route structure that serves the O'Hare would not be capable of providing a third independent, parallel arrival stream.

2.1.5.3 Adverse Weather

According to historical weather data, adverse weather occurs approximately ten percent of the time in the Chicago region. Adverse conditions are especially prevalent during the winter and spring months, resulting in periods of precipitation. Adverse weather affects operations at O'Hare on a recurring basis, whereas, an airport located in a warm, sunny and dry climate year-round is not as susceptible to similar weather conditions. The weather conditions that influence airfield capacity and runway orientation requirements include wind direction and velocity, visibility and cloud ceiling, and the presence or absence of precipitation. Adverse weather determines: 1) which runway operating configuration the Airport uses, 2) whether Land and Hold Short Operations (LAHSO)[11] can occur, and 3) aircraft separation requirements. Each of these three factors has an affect on the operational efficiency of O'Hare. Consequently, delays at O'Hare can reach exceptionally high levels during adverse weather conditions.

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[9] Two additional lesser-used arrival routes from RFA and SBN are merged into the northwest and northeast arrival routes, respectively, as aircraft approach O'Hare.

[10] Aircraft destined for the BAE and PETTY gates currently rely on a common departure corridor as they transition through C90 airspace. Similarly, departures destined for the PLL and MZV gates in certain operating configurations rely on an extended common departure corridor within C90 airspace.

[11] LAHSO – An air traffic control procedure intended to increase overall capacity without compromising safety. LAHSO include landing and holding short of an intersecting runway, taxiway, or some other designated point on a runway or taxiway.

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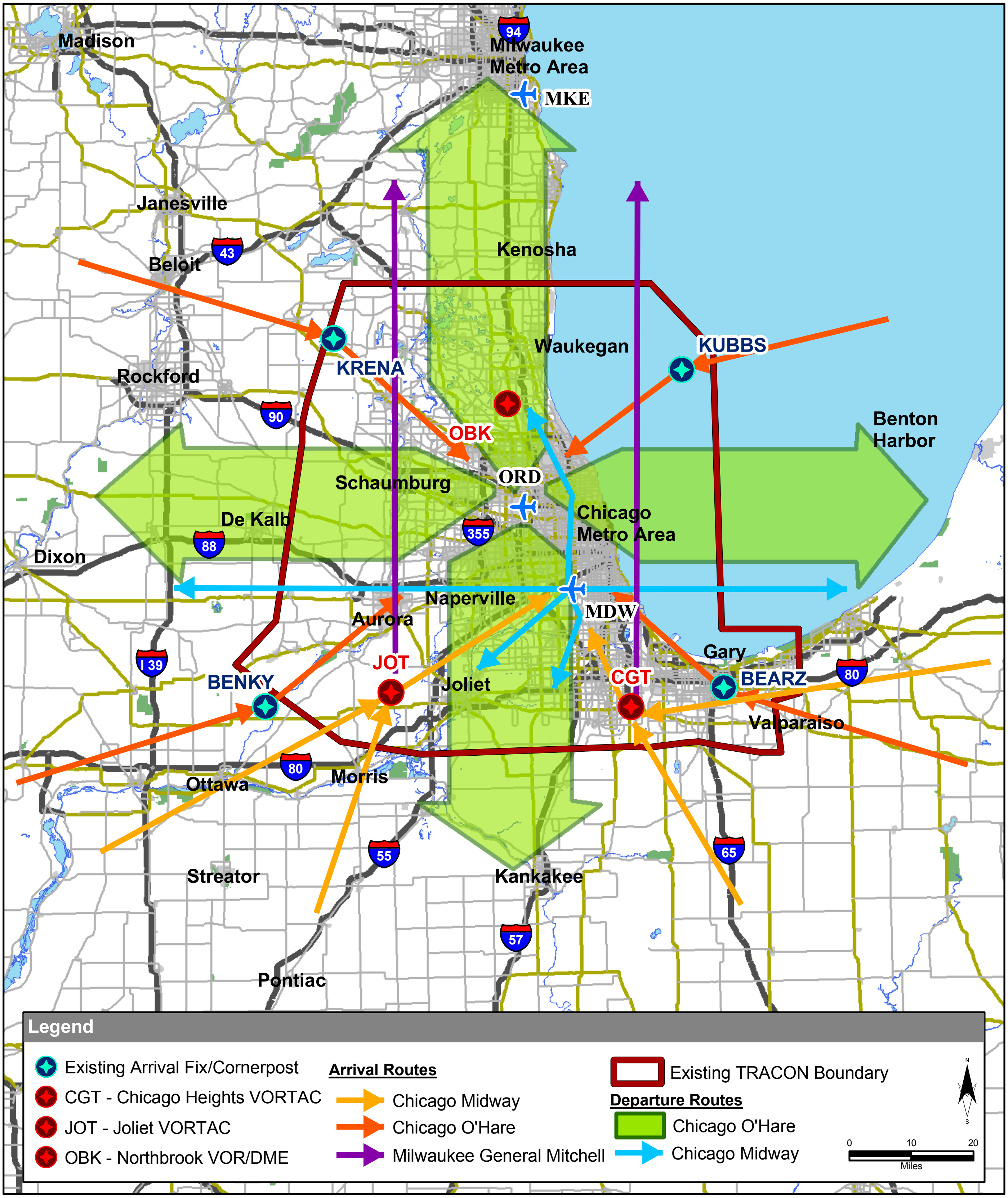

Source: Chicago Terminal Airspace Project Environmental Impact Statement, FAA 2000

Chicago O'Hare International Airport

O'Hare Modernization Environmental Impact Statement

Arrival and Departure Routes in the Chicago Region

Exhibit 2-2

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When weather and runway conditions permit, LAHSO are used at airports such as O'Hare to enhance capacity by reducing the dependencies caused by intersecting runways. LAHSO procedures outline requirements for both the pilot and the controller to ensure a safe operation. Utilizing LAHSO at O'Hare, for example, allows an aircraft arriving on Runway 22R to land in the first 6,050 feet of that runway and exit at Taxiway Zulu, short of the intersection of Runways 22R and 27R. Aircraft arriving Runway 27R therefore do not conflict with the arrivals on Runway 22R. Without LAHSO procedures, aircraft landing on Runway 22R would need to be sequenced by the arrival controller so as not to conflict with arriving aircraft using intersecting Runway 27R, since they would utilize the entire runway. This LAHSO procedure allows both runways to be used independently of each other, thereby enhancing existing capacity. IFR weather conditions or wet runway surfaces providing less than optimal breaking capability preclude the use of LAHSO procedures. The 2002 Chicago Delay Task Force recommended adoption of several additional LAHSO procedures for O'Hare. The FAA was not able to adopt most of these recommendations because of issues with the existing configuration of intersecting runways and the requirements of the LAHSO directive. These reasons are outlined in **Attachment A-18** in **Appendix A, Background**.

2.1.5.4 Peak Period Congestion

A typical arrival or departure peak period at O'Hare is about 60 to 90 minutes long and occurs at various times during the day. Groups or "banks" of aircraft arriving and departing within this 60 to 90 minute timeframe make up a peak period. Frequently at O'Hare, arrival and departure peak periods overlap. A graphic illustration of typical peak periods at O'Hare is depicted on **Exhibit 1-5**. **Exhibit 1-5** shows that the scheduled level of activity at O'Hare frequently exceeds the adverse weather (instrument flight rule - IFR)[12] capacity of the airfield and sometimes exceeds its good weather (visual flight rule - VFR)[13] capacity.

Peak period congestion at O'Hare can result from either a lack of airfield capacity in terms of runway capacity or gate availability because the number and configuration of gates at the Airport's passenger terminals cannot efficiently accommodate the number of aircraft on the ground. The peak period congestion requires FAA Air Traffic Controllers to hold aircraft on the ground at the origin airport[14] or slow the aircraft en route from its origin or in severe cases requiring aircraft to be placed in an airspace holding pattern. Such conditions adversely impact passengers, airlines, the environment, and the National Airspace System (NAS). Specifically, such impacts include: (1) further congestion in an already crowded airspace and airfield, (2) additional controller workload, (3) disruption to airline schedules, (4) unnecessary fuel

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[12] Instrument Flight Rules (IFR) – That portion of the Federal Aviation Regulations (14 CFR 91) specifying the procedures to be used by aircraft during flight in Instrument Meteorological Conditions. These procedures may also be used under visual conditions and provide for positive control by Air Traffic Control.

[13] Visual Flight Rules (VFR) – Rules and procedures specified in 14 CFR 91 for aircraft operations under visual conditions. The term VFR is also used in the United States to indicate weather conditions that are equal to or greater than minimum VFR requirements. In addition, it is used by pilots and controllers to indicate a type of flight plan.

[14] Flow control delays refer to the flights being held at their origin airport past their scheduled departure for O'Hare due to congestion on the airfield at O'Hare.

consumption and associated effects on air quality, (5) increased aircraft operating costs, and (6) decreased passenger convenience.

For example, if O'Hare is congested because the airfield lacks additional arrival runway capacity or gate availability to handle the peak period activity, an aircraft departing from any of the more than 170 airports receiving direct service may be delayed in its departure or slowed en route to O'Hare.[15] This length of additional time the aircraft is delayed or slowed en route results in the six conditions previously listed.

2.1.6 Historical Aircraft Delay at O'Hare

In January 2004, the FAA determined that delays at O'Hare during November and December of 2003 had "… a detrimental effect on the operational efficiency of the NAS."[16] This conclusion reflected the importance of O'Hare as a large network hub serving a major national and international market, and was based on the following considerations.

- In November and December of 2003, arriving passengers at O'Hare experienced a total of 1.7 million minutes (over 28,000 hours) of delay.
- During the same two months, 39 percent of the flights at O'Hare were delayed, with an average of 492 flights per day delayed an average of 57 minutes each.
- The percentage of on-time arrivals declined from 85 percent in October 2003, to 62 percent and 65 percent in November and December, respectively.

The Aviation System Performance Metrics (ASPM) index indicates that average delays reached 23.3 and 20.8 minutes per operation in November and December of 2003, respectively.[17] For the calendar year 2003, delays at O'Hare averaged 14.9 minutes per operation.[18] These elevated levels of delay in November and December of 2003 reflect high levels of aircraft activity combined with a high proportion of adverse weather conditions. ASPM data indicates that O'Hare experienced adverse weather conditions requiring the use of instrument flight rules (IFR) 32 percent of the time in November of 2003, and 22 percent of the time in December of 2003.[19] ASPM also indicated that O'Hare experienced adverse weather conditions about 16 percent of the time during calendar year 2003.[20] These delays at O'Hare led the FAA to issue the Order Limiting Scheduled Operations at O'Hare (Order); the Order is discussed more in **Section 2.2.4**, **FAA Orders Approving Limited Operations at O'Hare.**

Table 2-4 represents an examination of monthly ASPM data for the twelve-month period between October 2003 and September 2004. This analysis reveals consistently high levels of delay averaging just over 19 minutes per operation for the entire period and peaked at

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[15] As of October 2004, O'Hare had direct service to 175 destinations according to the Official Airline Guide.
[16] Order Limiting Scheduled Operations, FAA Docket FAA-2004-16944, January 21, 2004.
[17] Leigh Fisher Associates [TPC] analysis of FAA ASPM data, November 2004.
[18] Leigh Fisher Associates [TPC] analysis of FAA ASPM data, November 2004.
[19] Leigh Fisher Associates [TPC] analysis of FAA ASPM data, November 2004.
[20] Leigh Fisher Associates [TPC] analysis of FAA ASPM data, November 2004.

26.9 minutes per operation during the month of May 2004.[21] The *FAA Airport Benefit-Cost Analysis Guidance*, dated December 15, 1999 states:

> At 20 minutes of average delay (approximately the highest recorded average delay per operation known to FAA at an airport in the U.S.), growth in operations at the airport will largely cease. Prior to reaching these levels, airlines would begin to use larger aircraft, adjust schedules, and cancel or consolidate flights during peak delay periods. Passengers would make use of alternative airports, seek other means of transportation (e.g., automobile or train), or simply avoid making some trips.

As noted above, the delay levels cited in the *FAA Airport Benefit-Cost Analysis Guidance* reflect conditions found only at the nation's most congested airports, and do not represent a desirable condition. It also notes that prior to delays reaching 20 minutes of average delay that both passengers and airlines alter their activity.

TABLE 2-4
AVERAGE MONTHLY DELAYS AT O'HARE:
OCTOBER 2003 – SEPTEMBER 2004

Period	Average Delay Calculated as Excess Travel Time (minutes per operation)			Percent IFR Conditions
	Departure	Arrival	Average	
Oct-03	12.4	8.7	10.6	3.3%
Nov-03	20.7	26.0	23.3	26.9%
Dec-03	20.8	20.7	20.8	21.6%
Jan-04	25.8	26.8	26.3	17.3%
Feb-04	18.6	17.2	17.9	17.8%
Mar-04 (a)	22.6	23.8	23.2	20.8%
Apr-04	16.3	15.5	15.9	6.7%
May-04	29.2	24.7	26.9	12.1%
Jun-04	22.4	16.6	19.5	7.3%
Jul-04	23.0	15.6	19.3	6.0%
Aug-04	19.3	12.0	15.7	7.8%
Sep-04	12.4	5.6	9.0	2.7%
Average	20.3	17.8	19.0	12.5%

Note: (a) FAA orders limiting schedule operations at O'Hare went into affect March 1, 2004.
Source: TPC Analysis of FAA ASPM Data, December 2004.

The delays for O'Hare are also shown graphically in **Exhibit 2-3**. The *National Plan of Integrated Airport Systems* (NPIAS) *1993-1997*[22] states the following, "An airport is considered to be severely congested when average delays exceed 9 minutes per operation." **Exhibit 2-3** shows that in all six years shown 1998 through 2003 O'Hare's average annual delay was well above 9 minutes.

[21] Average annual delays at O'Hare based upon ASPM are included in **Table 2-2;** Average monthly delays at O'Hare based upon ASPM dating back to January 1998, contained in **Appendix A.**
[22] National Plan of Integrated Airport Systems (NPIAS) 1993-1997, FAA, April 7, 1995.

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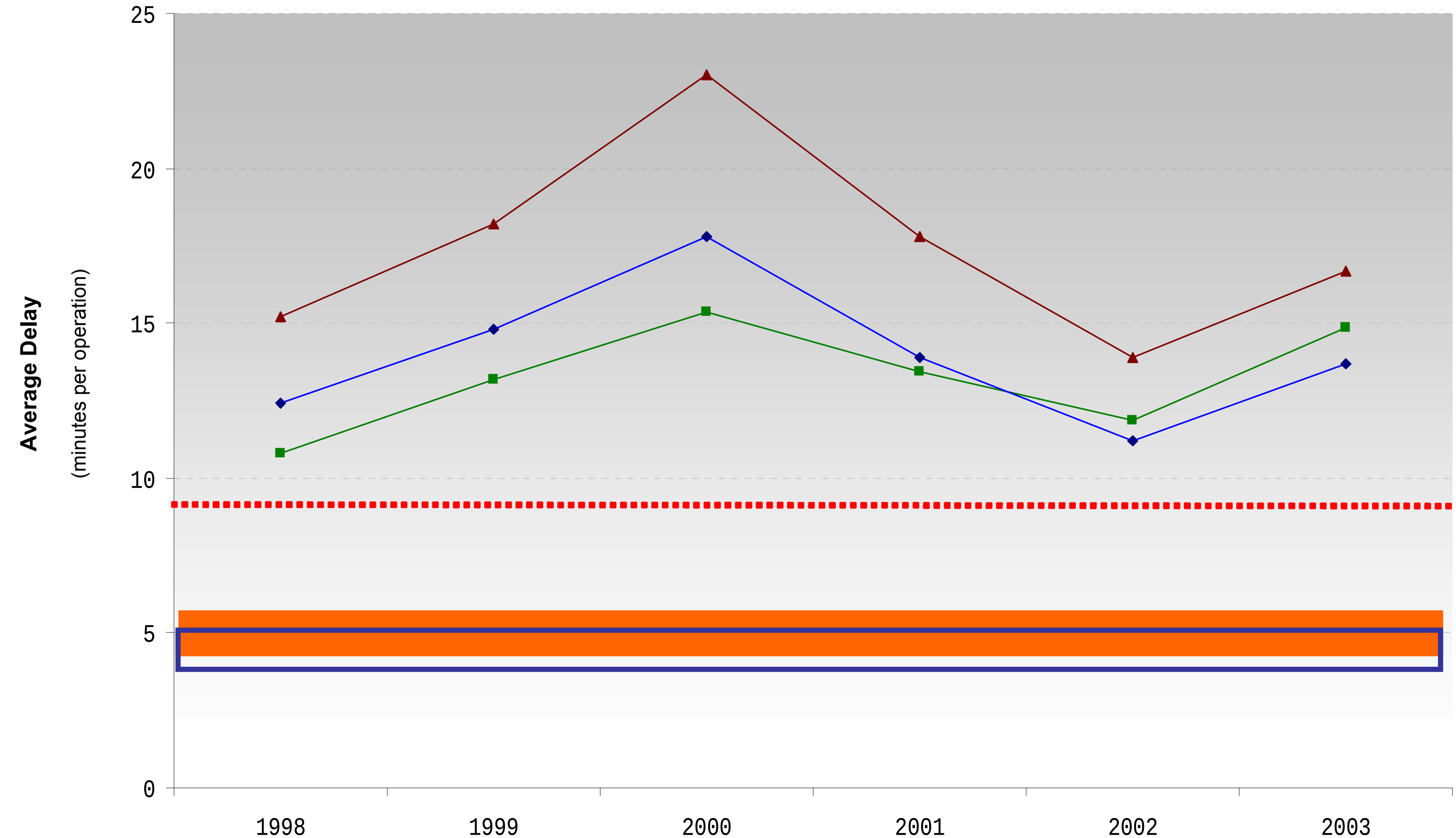

Source: Crawford, Murphy and Tilly, Inc. [TPC], 2004

Chicago O'Hare International Airport

O'Hare Modernization Environmental Impact Statement

Average Delays in ASPM O'Hare International Airport

▶ Exhibit 2-3

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Exhibit 2-3 also shows that for all six years O'Hare had delays exceeding the practical capacity limits[23] set forth in the following NPIAS reports for 1993-1997, 1998-2002, and 2001-2005.[24] The most recent NPIAS 2005-2009 does not use the term "practical capacity limits", but does state the following:

> Current FAA guidance recommends that capacity planning start when aircraft activity reaches 60 to 75 percent of an airport's airfield capacity. Since major airfield improvements often take 10 or more years from concept to opening, the recommendation allows adequate lead-time so that the needed improvement can be completed before a problem becomes critical.

The NPIAS 2005-2009 further states:

> The relationship between aircraft operations and delay is non-linear, and often exponential. Experience shows that airfield delay increases gradually with rising levels of traffic until a certain level is reached. Thereafter, the delay rises more rapidly with increased traffic. For larger airports, it is our observation that the onset of the more rapid growth in delay often occurs when delay is between 4 and 6 minutes per aircraft operation. In 2002, 17 airports had an average delay in excess of 6 minutes per operation.

Given that present delays at O'Hare are well beyond 6 minutes, O'Hare is indicative of an airport for which capacity enhancement should be considered. Select pages from the last four NPIAS' (1993-1997), (1998-2002), (2001-2005), and (2005-2009) are included in **Appendix A**, **Background**.

The growing delays at O'Hare continue to increase the congestion in the Chicago airspace. The FAA has documented Chicago airspace congestion in previous studies, including the *NAR Integrated Design Plan*,[25] which states:

> Some of the most congested en route airspace in the country is in the heart of the Great Lakes Region [AGL]. Because of the interconnectivity of facilities, en route congestion impacts terminal operations. This congestion creates delays in both the en route and terminal environments. In 2001, this region accounted for 24% of the nation's total en route operations and 49% of en route delays.

The "congested en route airspace" noted above is a further indication of the exacerbating effect of the delays at O'Hare on the NAS.

2.1.6.1 Simulated Airfield Delay at O'Hare

To further understand the future delays that would occur with and without the proposed projects, simulation modeling was conducted. In this case, the Total Airspace and Airport Modeller (TAAM) was utilized.[26] TAAM was used to (1) develop a comprehensive analysis of congestion and delay in each of the various phases of an aircraft operation and (2) provide input

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[23] Practical capacity limits set forth in 1993-1997 NPIAS was 4 to 6 minutes of average delay per operation; Practical capacity limits set forth in the 1998-2002 NPIAS and the 2001-2005 NPIAS was 3 to 5 minutes of average delay per operation.

[24] National Plan of Integrated Airport Systems (NPIAS) 1993-1997, FAA, April 7, 1995; NPIAS 1998-2002, FAA, March 12, 1999; NPIAS 2001-1005, FAA, August 28, 2002; NPIAS 2005-2009 Report to Congress, FAA, September 30, 2004.

[25] Integrated Design Plan National Airspace Redesign, FAA-Great Lakes Region, January 2003.

[26] TAAM Simulations conducted in 2003 and 2004 by the City of Chicago with FAA review, oversight, and approval.

to the air quality and noise impact assessments. Various years of analyses were simulated to predict the levels of delay that are expected at O'Hare in the future based on the forecast demand as presented in **Chapter 1**, **Introduction and Background**. **Table 2-5** summarizes the results of the simulation modeling, which presents a total average annual delay in minutes per operation for the various years of analyses. **Appendix D**, **Simulation Modeling**, contains the detailed modeling methodology and results.

Table 2-5 shows the constrained operational projections for the airfield without proposed actions. The constrained level of operations is not indicative of the future demand for air travel at O'Hare, rather it is an estimate of the level of operations that O'Hare can accommodate for a sustained period of time before the levels of delay exceed what airlines and the FAA deem "acceptable". For more information on acceptable level of delay and the constrained forecast, see **Appendix B**, **Aviation Demand Forecast**. The simulation results for the constrained level of demand indicate that by 2007 delays will exceed 15 minutes – even though the operations are held constant for modeling purposes as shown in **Table 2-5.** Due to O'Hare's existing runway layout, its good weather (VFR) capacity is significantly greater than the adverse weather (IFR) capacity (for more discussion see **Section 2.3.1.1**, **Reduce Delays**). This capacity difference, coupled with the fact that airline's schedules are typically based on the good weather capacity of airports, results in dramatic (over 1 hour per operation) adverse weather delays at O'Hare. As shown in **Table 2-5,** average IFR delays at O'Hare in 2002 were approximately 7 times greater than the average VFR delays. The magnitude of these adverse weather delays causes major disruption to flight schedules at O'Hare and throughout the NAS.

Table 2-5 also shows that good weather and total delays at O'Hare are projected to increase about 75 percent between the years 2002 and 2007. The latest figures from ASPM show that, in fact, from 2002 to 2004 delays increased by approximately 50 percent, even though the last nine months of 2004 were subject to FAA Orders Limiting Scheduled Operations at O'Hare (See **Section 2.2.4, FAA Orders Approving Limited Operations at O'Hare**). Historically, good weather conditions occur at O'Hare approximately 90 percent of the time. Because of this high percentage, good weather delays contribute substantially to the total average annual delays experienced at O'Hare. Although, the good weather delays are not of the magnitude of adverse weather delays at O'Hare, their impact on annual average delays has a substantial effect on airline's operating costs and passenger inconvenience. Additionally, the annual average delays projected in 2007, 2009, 2013 and 2018 at O'Hare would be among the highest experienced at any airport in the country today if no action were taken.

As described in **Section 2.1.5**, **Characteristics of O'Hare**, a number of factors contribute to unacceptable levels of aircraft delay at O'Hare. Among other factors, even when scheduled operations are constrained at a constant level, delay increases because of an accelerated change in the fleet mix, including more regional jets and more "large" aircraft. Thus, while use of more "large" aircraft would allow for additional enplanements, the simultaneous growth in regional jets imposes greater air traffic separation distances between the two types, thereby exacerbating existing delay.

TABLE 2-5
SUMMARY OF DELAY AT O'HARE- CONSTRAINED NO ACTION

Year	PMAD Scheduled Operations (a)	Average VFR Delay	Average IFR Delay	Total Average Annual Delay (b)
2002	2,648	6.8	48.1	9.3
2007	2,750	11.9	57.8	16.2
2009	2,750	11.7	57.1	15.9
2013	2,750	12.9	58.8	17.2
2018	2,750	12.9	58.9	17.1

Notes: (a) PMAD = peak month, average day; methodology for PMAD development defined in **Appendix B.**
(b) Delay numbers shown in minutes per operation and are adjusted to reflect an average annual delay.

Sources: Ricondo and Associates, Inc.[CCT] Preliminary Draft TAAM Simulation Data for Noise and Air Quality Analysis – [Existing Airfield 2002], January 2004;
Ricondo and Associates, Inc, [CCT] Preliminary Draft TAAM Simulation Data for Noise and Air Quality Analysis – 2007 No Action, July 2004;
Ricondo and Associates, Inc.[CCT] Preliminary Draft TAAM Simulation Data for Noise and Air Quality Analysis – 2009 No Action, July 2004;
Ricondo and Associates, Inc.[CCT] Preliminary Draft TAAM Simulation Data for Noise and Air Quality Analysis – 2013 No Action, July 2004;
Ricondo and Associates, Inc. [CCT] Preliminary Draft TAAM Simulation Data for Noise and Air Quality Analysis – 2018 No Action, July 2004.

2.2 FAA INITIATIVES

The following sections describe the national and regional actions undertaken by the FAA to address the need to increase capacity and reduce delay in the Chicago region and in the NAS.

2.2.1 Delay Task Force Initiatives

In response to high delays in the late 1980's, the City of Chicago and FAA co-chaired the 1991 O'Hare Delay Task Force (1991 O'Hare DTF) to examine ways to reduce delays at O'Hare. In the late 1990's and into 2000, delays at the Airport once again began to escalate. The FAA took action and, with the City of Chicago, formed a new task force to evaluate delay reduction alternatives once again. This culminated with the release of the 2001 O'Hare Delay Task Force (2001 O'Hare DTF). The 2001 O'Hare DTF consisted of local and national stakeholders from 28 organizations in the aviation industry, including the FAA, the airlines, and the City of Chicago. **Section 1.2.4.2**, **Recent O'Hare Planning and State Legislation**, contains more information regarding both O'Hare DTFs.

The FAA continues to evaluate, study, and implement procedures and delay reduction alternatives identified in the O'Hare DTF studies. This is an on-going effort attempting to implement delay reduction alternatives that produce operational benefits. The FAA has made significant progress in implementing a number of delay reduction alternatives from both studies. **Appendix A**, **Background**, includes spreadsheets that highlight the current status of projects being considered as a result of the DTF initiatives.

2.2.1.1 1991 O'Hare DTF

The 1991 O'Hare DTF culminated with 11 recommendations that were specific to O'Hare and 4 recommendations that were System Improvements. These options were reviewed and studied further after completion of the DTF. Of the 11 recommendations specific to O'Hare, 2 were implemented, 3 are on-going efforts, and 6 were not implemented. A number of the items recommended in the Study were not implemented. Of this number, some were not accomplished because the operational and capital costs associated with the project outweighed the benefits expected. Others involved procedures that were subsequently changed, thereby reducing the benefit of the option. As a result of implementation of delay reduction initiatives, delays decreased throughout the 1990's as operations continued to increase.

2.2.1.2 2001 O'Hare DTF

The 2001 O'Hare DTF identified 47 potential alternatives to improve the operating efficiency of O'Hare and reduce delays. Included were 22 alternatives with specific application at O'Hare and 25 alternatives that consist of national programs with application throughout the system. This study evaluated delay reduction alternatives that could be implemented in the short, mid, and long-term time frame. Overall, of the 47 potential delay reduction alternatives, 22 have been implemented, 20 are on-going and 5 were not implemented. More specifically, of the 22 alternatives that were identified at O'Hare, 6 have been implemented, 13 are on-going, and 3 were not implemented. Two of the three have not been implemented because a current Air Traffic waiver enables the airfield to perform as well as, if not better than, the delay reduction alternative itself.

It is important to note that while the 2001 O'Hare DTF effort documented potential annual delay savings in direct operating costs to the airlines, the savings are not additive from alternative to alternative.

2.2.2 National Airspace Redesign (NAR)

NAR is a multi-year FAA initiative to review, redesign, and restructure the nation's airspace to meet the rapidly changing and increasing operational demands on the NAS. The National Airspace Redesign is considering improvements in technology, aircraft equipment, infrastructure and procedures. NAR, a major element of the FAA's OEP, is designed to respond to increasing inefficiencies and delays in the NAS.

Focused on redesign of the airspace at high altitudes (initially at 39,000 feet and above), the NAR exploits new navigational technologies to allow suitably equipped aircraft to fly point-to-point instead of following the current system of routes based on ground-based navigational aids. The NAR also redesigns and optimizes local airspace to increase efficiency and reduce delays for flights in and out of terminal airspace. While it is a national effort, most NAR resources are being applied to geographic areas where the need is greatest such as Boston, New York Airports (LaGuardia, Kennedy and Newark), Philadelphia, Atlanta, Chicago, San Francisco, and Los Angeles.

Benefits of the NAR will include increased en route airspace access, increased throughput at major airports, and reduced airspace complexity. Airfield constraints at individual airports are frequently more limiting than the airspace serving those same airports. Unless these airfield constraints can be eliminated, the bottlenecks in the NAS will continue.

2.2.3 Operational Evolution Plan

The FAA's *Operational Evolution Plan* (OEP)[27] is an ongoing ten-year plan developed by the FAA to increase the capacity and efficiency of the NAS, while at the same time enhancing safety and security. The OEP, a system-wide strategy for the advancement of the NAS, includes both optimization of the airspace and the introduction of new concepts, technologies, and procedures. The plan is organized in the following core areas: Arrival/Departure Rates, En Route Congestion, Airport Weather Conditions, and En Route Severe Weather.

To implement the OEP, the FAA has developed the *Flight Plan 2005-2009* (*Flight Plan*). One of the goals of the Flight Plan is to "work with local government and airspace users to provide capacity in the United States airspace system that meets projected demand in an environmentally sound manner."[28] Specific objectives associated with this goal include:

- Increase airport capacity to meet projected demand.
- Increase or improve aviation capacity in the eight major metropolitan areas (including Chicago) and corridors that most affect total system delay.
- Increase on-time performance of scheduled carriers.
- Address environmental issues associated with capacity enhancements.

2.2.4 FAA Orders Approving Limited Operations at O'Hare

Over the years, there has been some effort to address delay issues at O'Hare (and other airports of critical significance to the NAS) through the imposition of controls on operations during certain hours.

Beginning in 1969, the FAA adopted a High Density Rule (HDR) that established limits on the number of takeoffs and landings during certain hours at five airports, including O'Hare. In 1984, the FAA amended the HDR to increase the hours in which limitations at O'Hare would apply and to increase the number of takeoffs and landings permitted at that airport. In 2000, Congress adopted legislation intended to phase out the HDR while preserving the FAA's authority over safety and the movement of air traffic.

Unprecedented levels of delay at O'Hare, and their "detrimental effect on the operational efficiency of the NAS"[29] prompted the FAA to convene delay reduction discussions by the authority vested pursuant to Section 422 of Public Law 108-176 (Vision 100 Century of Aviation Reauthorization Act, 49 USC §41722). In January of 2004, the FAA issued an *Order Limiting*

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[27] National Airspace System Operational Evolution Plan 2004-2014, FAA, January 2004.
[28] Flight Plan 2005-2009, FAA.
[29] Order Limiting Scheduled Operations, FAA Docket FAA-2004-16944-1, January 21, 2004. See Attachment A-4 in **Appendix A.**

Scheduled Operations (Docket No. 2004-16944-1) (Order) in response to the increasing delays at O'Hare, stating:

> FAA Aviation System Performance Metrics (ASPM) data showed that on a daily basis, from November 1 through December 31, 2003, 39 percent of O'Hare arrivals were delayed, with an average of 492 delays per day and an average of 57 minutes delay per delayed aircraft…In November [2003], delays at the airport more than doubled from the prior year period, resulting in the most delays ever reported at any airport in FAA's OPSNET in a single month since the FAA has been compiling daily statistics: over 15,000 delayed arrivals with an average delay of 62 minutes per aircraft. In November and December 2003, arriving passengers experienced a total of 1.7 million delay minutes at O'Hare…Because of O'Hare's unique status, this level of congestion at O'Hare has a detrimental effect on the operational efficiency of the NAS.[30]

This Order recognized recent voluntary agreements between FAA, United Airlines and American Airlines to temporarily (beginning March 2004 and ending September 2004) reduce the number of flights during peak periods between 1 p.m. and 8 p.m. local time by 5 percent in an effort to reduce the delay at O'Hare. Because activity levels at O'Hare are typically highest during the summer months, an urgent need to find a more permanent solution persists. The Order also notes that the FAA does not intend to establish a permanent practice of reducing delays by limiting scheduled operations. The most recent NPIAS states: "In announcing these [scheduling] agreements, both DOT and FAA emphasized that the restriction of services is not an acceptable long-term solution to congestion."[31] Further, the *Flight Plan* states, "This [the Order] is a necessary, but only short-term measure."[32] The Order is included in **Appendix A**, **Background**.

In April of 2004, the FAA issued *Amendment No. 1* to the Order (Docket No. 2004-16944-3) which furthered the schedule reductions stating,

> Beginning no later than June 10, 2004: (1) an additional schedule reduction of 2.5 percent of each carrier's total operations in the 1:00 p.m. through 7:59 p.m. hours local time including arrival reductions in specific times; (2) a reduction in the number of scheduled arrivals in the 12:00 p.m. local hour; and (3) reductions to continue through October 30, 2004.[33]

The amendment is also included in **Appendix A**.

By mid-summer 2004 the delays became so critical that the FAA convened a meeting with the carriers to discuss additional flight reductions at O'Hare. The severe congestion and delays at O'Hare during peak periods coupled with airline over scheduling led FAA Administrator Blakey (Administrator) to take action. **Appendix A** contains the following related documents:

- Letter from FAA Chief Counsel to Department of Justice, July 14, 2004;
- Letter from Department of Justice to FAA Chief Counsel, July 15, 2004;
- Determination by the Administrator July 16, 2004;

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[30] Order Limiting Scheduled Operations, FAA Docket FAA-2004-16944-1, January 21, 2004. See Attachment A-4 in **Appendix A.**
[31] National Plan of Integrated Systems (NPIAS) 2005-2009 Report to Congress, September 30, 2004.
[32] Flight Plan 2005-2009, FAA.
[33] Order Limiting Schedule Operations, Amendment No. 1, FAA Docket FAA-2004-16944-3, April 21, 2004. See Attachment A-4 in **Appendix A.**

- Written comments from United Airlines related to the Order, August 13, 2004;
- Written comments from American Airlines related to the Order, August 13, 2004;
- Written comments from the City of Chicago related to the Order, August 13, 2004.

An agreement was reached between all parties on August 18, 2004 which culminated with the issuance of a third Order (Docket No. 2004-16944-55), (included in **Appendix A**). The third Order stated,

> Based on discussions that occurred between the FAA and each of the participants, this order requires the two largest operators [United Airlines and American Airlines] at the airport to reschedule and reduce flight arrivals by approximately 5% during peak hours, freezes the level of arrivals operated by other large incumbent carriers (while requiring them to reschedule certain flights), and permits a small number of additional flights by limited incumbent air carriers and new entrant carriers. Although the product of voluntary action by various air carriers, this order is enforceable under the Administrator's civil penalty authority.[34]

During the meetings held by the Administrator, the FAA allowed submissions to the public docket. Following receipt of those submissions, the FAA included the following in Section V.F. of the Order (Docket No. 2004-16944-55) signed on August 18, 2004.

> Several submissions to the public docket expressed favorable or negative views on the expansion of O'Hare or on the airport operator's proposed O'Hare Modernization Program (OMP). Some submitters expressed their view that air traffic currently serving O'Hare should instead serve the region via other regional airports, either existing or proposed. The FAA convened the scheduling reduction meeting and solicited views and data from interested persons solely to determine a short-term limitation on the number of scheduled arrivals that will maximize the efficient operation of O'Hare for the six-month duration of this order.
>
> The order is not intended to evaluate or to prescribe any particular long-term avenue for increasing capacity and reducing delays at O'Hare. Independently of the scheduling reduction meeting and this public docket, the FAA is preparing an environmental impact statement evaluating the City of Chicago's proposal to build new runways at O'Hare and reasonable alternatives. The use of other existing and proposed airports will be considered in the environmental impact statement, consistent with the federal policy of increasing airport capacity and imposing artificial restrictions on capacity to alleviate delays only after other reasonably available and less burdensome alternatives have been tried. The FAA has announced a streamlined environmental review process that calls for an FAA decision by September 2005.[35]

On August 24, 2004, FAA Associate Administrator of Airports, Woodie Woodward wrote to the Mayor of Rockford, Illinois and Gary, Indiana. The letters were very similar and are contained in **Appendix A**, **Background**. Three paragraphs are quoted in part below:

> The problem at ORD [O'Hare] is twofold: the airlines' overscheduling of flights and the airport's capacity. We held recent meetings in Washington, DC, with airlines providing service at ORD. We have now reached an agreement with those airlines on ways to address the scheduling problems at ORD. The capacity issue requires an examination of potential long-term solutions at ORD and other airports in the area…

[34] Order Limiting Schedule Operations, FAA Docket FAA-2004-16944-55, August 18, 2004. See Attachment A-1 in **Appendix A.**

[35] Order Limiting Schedule Operations, FAA Docket FAA-2004-16944-55, August 18, 2004. See Attachment A-11 in **Appendix A.**

> The airlines themselves make airline business decisions on routes and destinations based on many criteria including demand, capacity, revenue potential, and accessibility. In 1978, Congress eliminated the Federal Government's role in decisions on airline destinations. While the Federal Aviation Administration (FAA) does not have the authority to divide demand between airports, we would support an airline's decision to consider beginning operations at [other regional airports]…
>
> Because the FAA cannot assign demand between airports, we suggest that you continue working directly with the airlines. Meanwhile, as we continue to examine capacity issues and potential solutions, we will consider the potential roles and interaction of airports throughout the region, including [other regional airports]…[36]

On March 25, 2005, the FAA issued a Notice of Proposed Rulemaking (NPRM) to extend the limitation of flight schedules:

> The FAA is proposing this rule to address persistent flight delays related to over-scheduling at O'Hare International Airport (O'Hare). This proposed rule is intended as an interim measure, because the FAA anticipates that the rule would yield to longer term solutions to traffic congestion at the airport. Such solutions include an application by the City of Chicago that, if approved, would modernize the airport and reduce levels of delay, both in the medium term and long term. For this reason, the proposed rule includes provisions allowing for the limits it imposes to be gradually relaxed and in any event would sunset in 2008.

The NPRM makes clear, however, that the use of arrival caps as a method of reducing flight delays is not preferable to the long term goal of increasing airport capacity through infrastructure enhancements. As stated:

> Although arrival caps are being proposed in this rule, imposing caps on the use of airport capacity does not meet aviation demand; rather, such caps artificially limit operations during certain hours to achieve the benefit of delay reduction. The FAA's preferred approach to reducing delay and congestion is to increase airport infrastructure so that capacity meets demand. Because a timely increase to airport capacity is not always feasible, alternative measures may be necessary to address congestion that adversely affects the efficiency of the national airspace system.

A copy of the NPRM is included in **Appendix A, Attachment A-19**.

As a policy matter, such restrictive administrative steps are not likely to be viewed as an effective long-term solution, as long as the prospect for additional airport improvements is under consideration.

2.3 PURPOSE AND NEED FOR THE PROPOSED ACTION

CEQ Regulations implementing NEPA require that an EIS specify the underlying purpose and need to which an agency is responding in proposing alternatives, including the proposed

[36] FAA letters to Gary, Indiana and Rockford, Illinois dated August 24, 2004. See Attachments A-12 and A-13 in **Appendix A.**

action, (40 CFR §1502.13). Because airport capacity improvements in the NAS are dependent upon the initiatives of individual airport sponsors, the FAA gives special consideration to the purposes of the airport sponsor. The airport sponsor, in this case the City of Chicago, has prepared a Master Plan for O'Hare describing specific aviation and air transportation problems facing the Chicago region today and in the future. This EIS addresses various potential solutions to these critical airport capacity and efficiency issues. Accordingly, the proposed Federal action, which is the subject of this EIS, encompasses the following purposes:

- Address the projected needs of the Chicago region by reducing delays at O'Hare, and thereby enhancing capacity of the NAS.
- Ensure that existing and future terminal facilities and supporting infrastructure (access, landside, and related ancillary facilities) can efficiently accommodate airport users.

To accomplish these purposes, a number of specific planning issues or problems must be resolved. The following sections identify the specific needs addressed in this EIS.

2.3.1 Purpose 1: Address the Projected Needs of the Chicago Region

Continuing the role held by Midway Airport before Midway was eclipsed by the jet-age, O'Hare plays a vital role both for the Chicago region and in the NAS. It provides an extensive network of air service to and from one of the nation's largest metropolitan areas, and also by serving as a central connecting point in the nation's air transportation network. O'Hare is uniquely suited to this role by virtue of its large local market, which is expected to increase in the future. This large local market, coupled with its central location in the NAS, provides opportunities for connecting service to many destinations, as well as its central location in the NAS. Consequently, O'Hare has consistently ranked as one of the busiest airports in the United States. Under the current airport configuration, playing this role comes at the cost of high levels of aircraft delay.

As previously documented, O'Hare is ranked as one of the most delay-prone airports in the country. Delays at O'Hare have a direct impact on the entire NAS, in part because approximately 51 percent of the total passengers traveling through O'Hare currently connect to and from other airports.[37] In 2003, the magnitude of delays at O'Hare, when contrasted with the 19 other most delayed airports in the NAS, shows that almost one-third of the share of delays at those facilities occur at O'Hare. In light of the significant role that O'Hare plays for connecting traffic, this level of delay clearly impacts many other airports and propagates further delays and inefficiencies throughout the NAS. **Exhibit 2-4** shows that O'Hare's share of delays is at least twice those experienced by Atlanta or Newark, the next most delayed airports. Additionally, O'Hare affects the NAS because the airfield lacks adequate runway capacity or gate availability to handle the current and forecast levels of both originating and connecting activity. O'Hare operations also directly affect the networks of 47 domestic and international passenger airlines providing service to 127 domestic and 48 international airports (see **Section 1.2.2**, **Airline**

[37] Leigh Fisher Associates, Inc. [TPC] based on DOT databases: Passenger Origin and Destination Survey Database, T-100 Onboard Database, USDOT 298(c) Enplanement Database.

Operations at O'Hare), and indirectly affect several other airports. In 2002, delays cost the airlines and other commercial operators at O'Hare alone nearly $225 million in aircraft direct operating costs.[38] In 2007, delays are expected to cost O'Hare's aircraft operators over $674 million in aircraft direct operating costs annually.[39] Because delays at O'Hare result in delay throughout the NAS, other airports, airlines and passengers incur additional costs not reflected in the figures above.

The following sections introduce how the needs of the Chicago region could be met by reducing delays at O'Hare and thereby increasing capacity of the NAS.

2.3.1.1 Reduce Delays

Adverse Weather

The average annual all-weather (all conditions) delay per operation is a convenient way to describe airport efficiency because it is a single number. Using a single number can, however, obscure the impact that may occur when adverse weather requires instrument flight rules (IFR) operations. At most airports, good weather conditions that permit use of visual flight rules (VFR) occur a majority of the time. Because airlines typically schedule operations for the prevalent weather conditions, and are not able to modify schedules in response to varying weather conditions, aircraft delay is especially severe when the IFR capacity of an airport is substantially lower than its VFR capacity. As a result, total NAS aircraft delay is heavily influenced by IFR operations at key airports. When an airport is a major airline connecting hub or when the airport contains multiple hubbing operations, the adverse weather (IFR) delays at the airport affect the entire NAS.

At O'Hare, the adverse weather (IFR) arrival acceptance rate[40] does not meet the current arrival demand. This IFR acceptance rate is partially limited by the intersecting or converging nature of the existing runway system. This effect is best illustrated in **Exhibit 2-5,** which shows that scheduled arrival and departure demand peaks at O'Hare in 2003 reached, and sometimes exceeded, the good weather (VFR) acceptance rate of the airfield, and even more often exceeded the adverse weather (IFR) acceptance rate. **Table 2-5** shows that while the average annual delays were estimated using TAAM to be 9.3 minutes per operation in 2002, adverse weather

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[38] Ricondo and Associates, Inc. [CCT], Draft TAAM Simulation Data for Noise and Air Quality Analysis – [Existing Airfield 2002], Table I-10, ORD Arrival Pre-departure Ground Delay at ORD, January 2004; Leigh Fisher Associates [TPC] estimate of an average cost of approximately $25 per minute of delay computed using aircraft operating cost data from U.S. Department of Transportation Form 41 filings for Calendar Year 2003.

[39] Ricondo and Associates, Inc. [CCT], Draft TAAM Simulation Data for Noise and Air Quality Analysis – 2007 No Action, Table I-10, ORD Arrival Pre-departure Ground Delay at ORD, January 2004. Delay cost estimated based on an average unit aircraft direct operating cost of approximately $25 per minute as calculated by Leigh Fisher Associates using aircraft operating cost data reported in U.S. Department of Transportation Form 41 filings for Calendar Year 2003.

[40] Acceptance rate is the number of operations a runway or runway system can handle in a one-hour period.

(IFR) delays averaged about 50.1 minutes per operation. In contrast, good weather (VFR) delays estimated using TAAM averaged about 7.1 minutes per operation.[41]

[41] Ricondo and Associates, Inc. [CCT] Preliminary Draft TAAM Simulation Data for Noise and Air Quality Analysis – [Existing Airfield 2002], January 2004.

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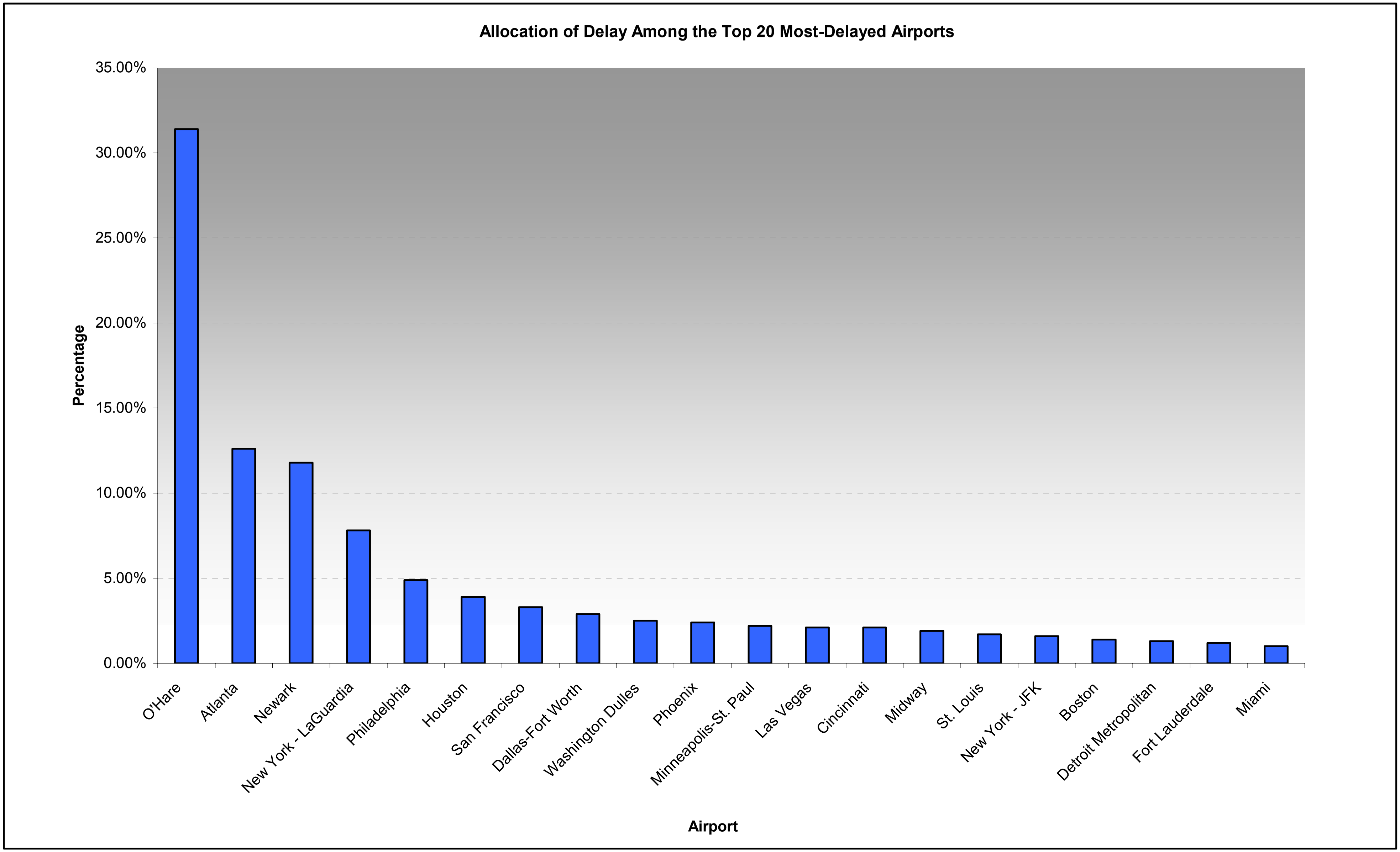

Source: FAA OPSNET; Crawford, Murphy and Tilly, Inc. [TPC], December 2004.

Delays at Top 20 Airports OPSNET

Exhibit 2-4

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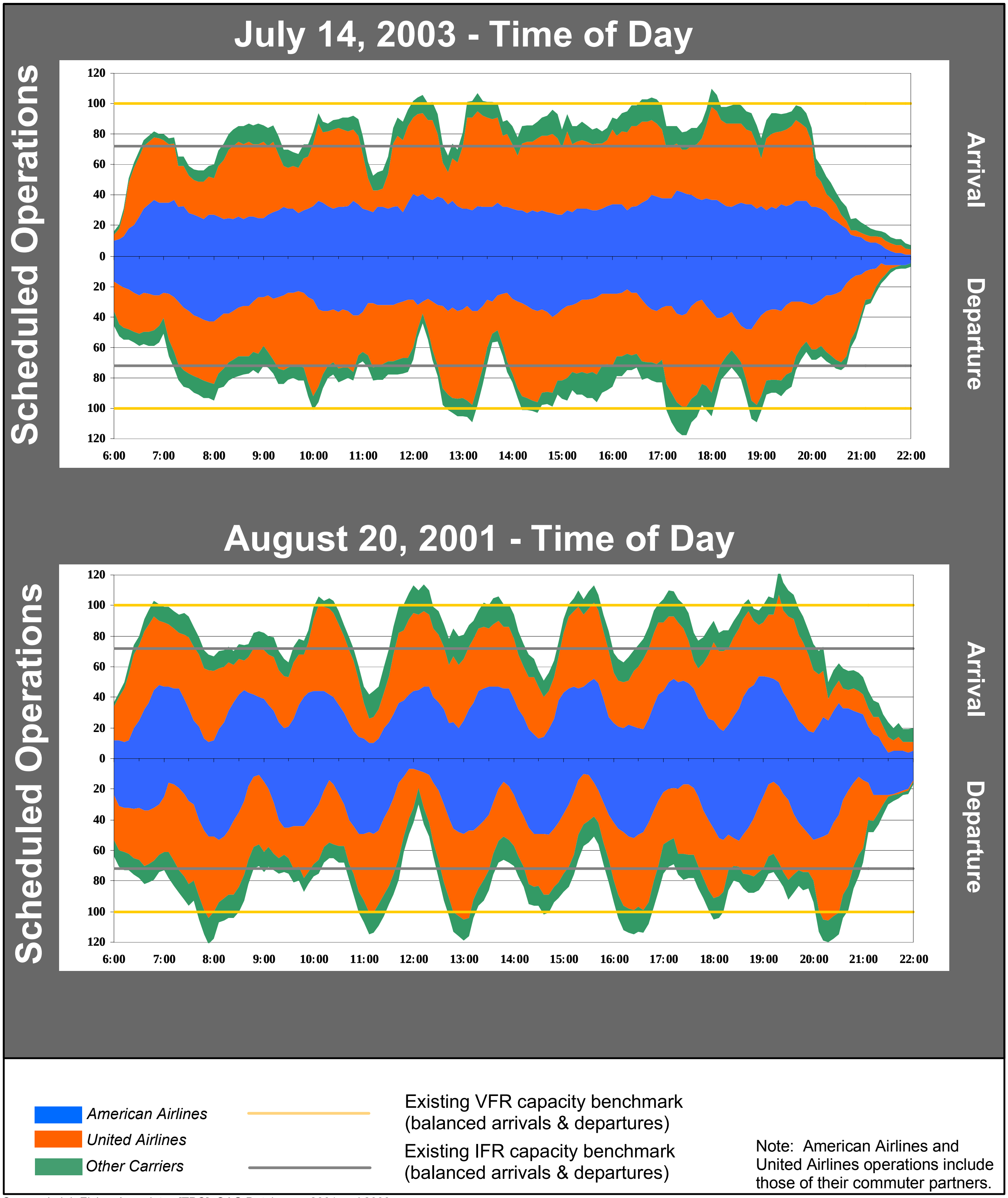

Note: American Airlines and United Airlines operations include those of their commuter partners.

Source: Leigh Fisher Associates [TPC], OAG Databases, 2001 and 2003.

Chicago O'Hare International Airport

O'Hare Modernization Environmental Impact Statement

Daily Arrival/Departure Demand Profiles for O'Hare 2001 & 2003

▶Exhibit 2-5

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TAAM simulation analyses for 2002 estimate the maximum acceptance rate for O'Hare in good weather conditions at between 98 and 114 arrivals per hour. In contrast, the adverse weather acceptance rate is estimated at between 66 and 80 arrivals per hour. Consequently, for 2002 the estimated delays in good weather ranged from 5.5 to 16.3 minutes per operation, while delays in adverse weather averaged from 36 to 74 minutes per operation.[42] When weather conditions result in a reduction in the arrival acceptance rate, flow control programs are implemented by FAA personnel slowing the arrival rate of aircraft into the Chicago area. Such delays cause holds to be placed on inbound aircraft at the origin airport while waiting for clearance to depart for O'Hare.

Changing operational configurations of runways (e.g. VFR to IFR) to balance arrival and departure capacity at an airport as complex as O'Hare requires extensive coordination between air traffic controllers at the O'Hare Airport Air Traffic Control Tower (O'Hare Tower), the Chicago O'Hare Terminal Radar Approach Control Facility (Chicago TRACON), and the Chicago Air Route Traffic Control Center (Chicago Center). The dynamic nature of balancing arrival and departure flows at O'Hare can make the capacity of the Airport and its associated airspace very sensitive to unexpected changes in local weather conditions.

Changing from arrival priority to departure priority, and vice versa, requires changing runway assignments, which affects aircraft routing at substantial distances from O'Hare. With the spreading of the arrival and departure peaks since 2001 (shown in **Exhibit 2-5**), it is more difficult presently to change runway configurations because the demand is spread more evenly throughout the daytime hours. Therefore no recovery time, or valleys in the activity profile, occurs permitting air traffic controllers the flexibility to change configurations.

2.3.1.2 Efficiently Accommodate Aviation Operating Needs

Airline connecting hubs such as O'Hare, experience high levels of aircraft activity associated with both local and connecting traffic. The previous section discussed the airfield capacity issues addressed in this EIS. The following sections discuss the accommodation of aviation operation needs including: (1) adequate capacity to reduce delays associated with airline connecting hub activity; (2) the ability to accommodate changes in airline fleets, such as the increasing use of regional jets (RJ)[43] and the anticipated introduction of new large aircraft (NLA); and (3) adequate runway length to accommodate heavy and/or long haul flights without payload penalties.

Accommodate Originating and Connecting Hub Activity

In **Table 2-6**, the projected future operations and enplanements at O'Hare under both the No Action Alternative and the Build Alternatives are shown. The inability to efficiently

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[42] Ricondo and Associates, Inc. [CCT] Preliminary Draft TAAM Simulation Data for Noise and Air Quality Analysis – [Existing Airfield 2002], Table I-10, ORD Arrival Pre-departure Ground Delay at ORD, January 2004.

[43] Regional Jets (RJ) can generally be defined as jet aircraft with fewer than 100 seats. The FAA and General Accounting Office (GAO), as well as the aviation industry, use differing levels of detail in defining RJs depending on the context.

accommodate expected future growth at O'Hare would have a significant adverse impact upon the region. Not only would travelers to and from O'Hare suffer a higher level of delay than most other users of the NAS, but also flights to smaller markets currently served are likely to be eliminated by market forces operating under the present operational constraints. In addition, it is possible that the Agency's policy of continuing to promote competition in the nation's third largest market could be impeded by extraordinary levels of delay and limited capacity. Especially in light of the region's projected aeronautical needs, it is vital for both Chicago and the NAS that these delays be reduced.

TABLE 2-6
FORECAST SUMMARY

Annual Forecast Summary	Unconstrained – Alternatives C, D and G (a)				Constrained – No Action Alternative (b)			
	2007	2009	2013	2018	2007	2009	2013	2018
Total Enplaned Passengers	36,943,000	39,149,000	43,912,000	50,372,000	36,219,500	37,717,500	40,908,500	44,972,500
Total Aircraft Operations	1,026,300	1,057,000	1,120,600	1,194,000	974,000	974,000	974,000	974,000

Source: (a) Federal Aviation Administration, 2002 Terminal Area Forecast;
(b) TPC analysis.

Chicago has always been a transportation hub, having initially served as a transfer point between overland and water routes (as discussed in **Chapter 1**, **Introduction and Background**), and later as a center for numerous rail lines developed in the 1800s and early 1900s. The size of the Chicago air travel market ensures that it will continue to attract a very substantial amount of air service. Because of its relative capabilities, and its location with respect to regional population and employment centers, and major surface transportation infrastructure, O'Hare is likely to continue serving a large share of that market.

Two major air carriers, United Airlines and American Airlines, currently use O'Hare as a hub for both domestic and international operations. In light of the fact that several of the nation's air carriers are presently in bankruptcy, along with continued reports that other carriers are also discussing such issues, the FAA considered the prospect of a potentially diminished purpose and need in the event that one of these carriers may be liquidated. After careful consideration of the effects on operations at other large hubs where a carrier has disappeared from the market, FAA has concluded that liquidation of a significant operator at O'Hare would likely cause a brief reduction in operations at O'Hare. It is the FAA's expectation, based on its analysis of similar events at other very large hubs (e.g. Atlanta and Denver), that levels of service forecast in this EIS would resume. Thus, even in the absence of one of these carriers, O'Hare, due to its geographic location in the central United States and strong origin/destination demand, would continue to function as a national connecting hub regardless of the specific air carriers serving the market. For a more detailed discussion of this issue, as well as other scenarios, see **Appendix R**, **Alternate Considerations**.

Accommodate Changes in Airline Fleets and Industry Trends

The evolution of the air transportation industry has been accompanied by dramatic changes in the commercial aircraft fleet. O'Hare and other airports have had to accommodate larger aircraft carrying 3 or 4 times as many passengers as the first jet transports, as well as smaller commuter aircraft with one third to one half the seating capacity of the earliest jets. Each aircraft type has its own requirements in terms of runway length, parking facilities, and airfield geometry (e.g. taxiway width and turn radii). In addition, mixing aircraft of different sizes and weights introduces airspace separation requirements due to varying aircraft operating characteristics such as approach and landing speed. As the air transportation industry continues to evolve, airports must have the flexibility to accommodate a continually changing fleet.

The evaluation of airfield capacity and delay involves the consideration of not only weather and operating characteristics described previously, but also air traffic procedures, which vary with the types of aircraft serving an airport. As the types of aircraft change, and the mix of those aircraft change at a given airport, those changes can affect the available capacity and thus cause delay.

Throughout the country and at O'Hare, air carriers have made growing use of regional jets (RJ) in today's economic conditions to provide continued commercial service to medium and small markets. RJ service at O'Hare includes markets such as Portland, ME; Syracuse, NY; and Memphis, TN. Similarly, the anticipated introduction of New Large Aircraft (NLA)[44] also creates additional challenges for airfield operations at O'Hare. Since its introduction, the RJ has become the fastest growing aircraft type in the airline industry fleet. Specifically at O'Hare, RJ activity increased from approximately 21 percent of daily scheduled passenger operations in August 2001 to approximately 35 percent in August 2003.

The RJ provides service levels similar to mainline jet aircraft with operating characteristics and costs that make it a feasible and attractive replacement to 1) small mainline narrowbody jets and 2) turboprop commuter aircraft. In the former role, RJs are often being used to serve off-peak, high frequency markets like Boston, MA or White Plains, NY. From an operational perspective, it should be noted that when regional jets are used as replacements for mainline aircraft that have greater seating capacities, more operations are needed to accommodate the same number of passengers.

The transition from turboprops to regional jets has also had an impact on service to some small communities. During August 2001, two carriers served 19 markets from O'Hare with turboprop equipment. By August 2003, all turboprop flights at O'Hare had been eliminated. Of the markets served by turboprops during August 2001, 13 retained service to O'Hare with regional jets in August 2003. However, the remaining 6 markets, primarily small communities, lost all scheduled air access to O'Hare.[45] It should also be noted that no Essential Air Service (EAS)[46] markets currently have access to O'Hare.

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44 New Large Aircraft (NLA) – Group VI Aircraft - aircraft with wingspan from 214 feet up to but not including 262 feet.
45 These 6 markets are: Tri-Cities, TN, Quincy, IL, Waterloo, IA, Iron Mountain, MI, Muskegon, MI, and Oshkosh, WI.
46 The Essential Air Service (EAS) program, administered by the Department of Transportation (DOT), was put into place to guarantee that small communities that were served by certificated air carriers before deregulation maintain a minimal level of scheduled air service. The DOT currently subsidizes commuter airlines to serve

The NLA aircraft category, or Airport Design Group (ADG) VI, includes the Airbus A380 aircraft that is currently in production. Airbus anticipates that this aircraft will enter airline service in 2006. FAA airport design standards for ADG VI aircraft specify the following minimum airfield dimensions: taxiway centerline to runway centerline, 600 feet; runway width, 200 feet; and taxiway width, 100 feet. The A380 manufacturer recommends a minimum runway length of 10,300 feet.[47] About 129 A380 orders have been placed by international carriers, although specific airline fleet additions at O'Hare are unknown at this time.[48] Preliminary analysis indicates that only seven existing gates at O'Hare can accommodate the larger wingspan and increased length of this aircraft. The NLA also presents several operating challenges for the existing airfield area: (1) only Runway 14R/32L meets the FAA's design criteria for Group VI aircraft; (2) the parallel taxiway for Runway 14R/32L does not have adequate separation to allow for unrestricted Group VI taxiing; and (3) the existing airfield does not meet the FAA's design criteria for ADG VI taxiways and pavement geometry. Therefore, significant operational limitations on specific taxiways would be required to accommodate the A380. Also, taxiway connector access, blast pads, pavement shoulder widths, pavement fillets, and airfield lighting, navigational aids, marking and signage will also be required to meet FAA ADG VI requirements. Aircraft parking, passenger loading, baggage handling and aircraft servicing are other issues that need to be addressed when considering this type of aircraft.

Accommodate Runway Length Requirements

According to FAA planning criteria, the recommended length for a primary runway must be determined by considering either the family of aircraft having similar performance characteristics or a specific aircraft needing the longest runway. In either case, the choice should be based on aircraft that are forecast to use the runway on a regular basis. Currently, runway lengths at O'Hare vary from 7,500 feet for Runway 4L/22R (the shortest runway at O'Hare) to 13,000 feet for Runway 14R/32L (the longest runway at O'Hare). The remaining runways range from nearly 8,000 feet to 10,500 feet.

According to FAA Order 5090.3C, *Field Formulation of the National Plan of Integrated Airport Systems (NPIAS)*, airport dimensional standards, including runway length, should be selected which are appropriate for the critical aircraft[49] that will make substantial use[50] of the airport during the planning period.

The *2004 O'Hare Master Plan* analyzed runway length requirements based on the existing fleet operating at the Airport, and the assumption that future operations would include the A380. The analysis showed that a runway length of 12,250 feet would be sufficient for all aircraft types

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approximately 100 rural communities across the country that otherwise would not receive any scheduled air service.

47 Runway calculated at max takeoff weight under ISA + 15ºC conditions as per Airplane Characteristics for Airport Planning AC, A380, Preliminary Issue, January 2002, Airbus S.A.S.

48 Airbus Industries, Website: http://www.airbus.com/media/a380_family.asp, March 22, 2004.

49 The critical aircraft may be a single aircraft or a composite of the most demanding characteristics of several aircraft.

50 Substantial use means either 500 or more annual itinerant operations, or scheduled commercial service.

and markets.[51] Comments received from airline representatives indicate that a maximum runway length of 13,000 feet would provide an adequate buffer for future needs.[52]

A runway length of 7,500 feet meets the requirements for over 85 percent of the departures at O'Hare. This length also meets the wet and dry runway landing length requirements for all aircraft operating at O'Hare, except for large widebody aircraft such as the Boeing 747. About 15 percent of the aircraft departing O'Hare require more than 7,500 feet of runway length. These departures include aircraft such as the MD-82/83, typically destined for the west coast. Also, manufacturer's data indicates that runway lengths greater than 10,300 feet should be provided where practicable to accommodate NLA such as the Airbus 380.

To maximize the operational efficiency and flexibility of the airfield, the need for Air Traffic to segregate aircraft with different runway length requirements should be minimized. Providing more runways with adequate length for all arrivals and departures minimizes this need to segregate the aircraft. Also, it is important to provide runways of adequate length that do not interfere with the use of other runways. For example, during VFR east flow operations (Plan X), a full-length Runway 14R departure requires FAA Air Traffic to create gaps in the arriving aircraft streams for Runways 9L and 9R. This interaction between the departure stream off Runway 14R and the arrival streams of Runways 9L and 9R causes both a departure delay (to the aircraft on 14R) as well as arrival delays (for the aircraft arriving 9R and 9L). For a graphical depiction of Plan X, as well as the other primary runway operating configurations, refer to **Appendix A, Section A.4.2**, **Runway Operating Configurations.**

2.3.2 Purpose 2: Provide Adequate Terminal Facilities and Supporting Infrastructure

This section describes the need to provide terminal facilities and supporting infrastructure to efficiently accommodate existing and future airport users. Many aspects of an earlier initiative by the City of Chicago, referred to as the World Gateway Program (WGP), were incorporated into the O'Hare Modernization Program; the specifics of WGP are contained in **Chapter 1**, **Introduction and Background**. To meet the needs of airlines, passengers, air cargo operators, and other Airport users, the capacity of terminal and support facilities should be in balance with the capacity of the airfield. The following sections identify the specific problems that require action.

2.3.2.1 Provide Adequate Terminal, Gate, and Apron Areas

In 2002, O'Hare accommodated 33 million annual enplanements. The current terminal complex contains about 4.7 million square feet, providing 189 contact gates with 25,529 linear feet of frontage, as well as 20 remote parking positions, or "hard stands".[53] Based on the forecast of peak hour operations, it is estimated that a total of 232 gates will be needed by 2018, although differing gate requirement analyses yield a range of 219 to 265 gates for the same level of

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[51] O'Hare International Airport Master Plan, City of Chicago, Page IV-17, February 2004.
[52] O'Hare International Airport Master Plan, City of Chicago, Page IV-17, February 2004.
[53] O'Hare International Airport Master Plan, City of Chicago, February 2004; World Gateway Program Final EA, FAA, Section 1.2.3, June 2002.

demand.[54] Expansion of other terminal functional areas and terminal apron areas will also be required to meet forecast demand. In addition, the existing terminal configuration presents the following items that contribute to constraints:

- **Need for Additional Gates** - About 43 additional gates will be required to accommodate forecast growth by 2018.
- **Need to Decrease Physical Separation of Alliance Partners** - Air carrier operations are separated from their alliance partners, resulting in inconvenience for passengers connecting between alliance members as well as inefficient operations for the air carriers and their alliance partners. International arriving passengers making connections from their airline to its domestic alliance partners are required to travel from the Terminal 5 to Terminals 1, 2 or 3. Because of this physical separation, passengers cannot benefit from the potential seamless link offered by alliance partners.
- **Need for Additional Federal Inspection Services (FIS) Facilities** - Currently, all FIS facilities are located in Terminal 5, which is not contiguous with the domestic facilities and gates in the other terminals. Because all international arrivals (except pre-cleared flights from Canada) must use these facilities, domestic airlines providing international service must operate out of multiple terminals. The separation of the International terminal from the other terminals also results in inconvenience for passengers connecting from international to domestic flights. Arriving international passengers must proceed through all required FIS or Customs functions in Terminal 5 before continuing with their trip. If a passenger is connecting to a domestic flight, they must re-check their baggage in Terminal 5, and then travel to Terminal 1, 2, or 3 via the Airport Transit System (ATS), where they are required to pass through a security checkpoint before walking to their domestic gate and boarding their flight. Even under the best of circumstances, this process is time-consuming and inconvenient. If the arriving international flight is late, this journey frequently results in missed connections and additional expense. Because the domestic and international terminals at O'Hare are physically separated, passengers cannot fully benefit from the potentially "seamless" link offered by the alliances.
- **Need for Accommodating New Entrants** - The 21 gates and 5 hard stands in Terminal 5 today are the only nonexclusive gates at O'Hare. Consequently, new entrant carriers must either use these gates or sublease gates from an incumbent carrier. Gates at the other terminals (Terminals 1, 2, and 3) already average 7 to 11 turns per day, which is above the national industry average for gate utilization.[55] Consequently, there is minimal opportunity for additional activity at those gates. The 21 gates and 5 hardstands at Terminal 5 average slightly more than 3 turns per day,[56] and thus provide an opportunity for new entrants in the near term. Over the long term, these

[54] O'Hare International Airport Master Plan, City of Chicago, February 2004.
[55] Chicago Airport System Competition Plans, O'Hare International Airport, October 24, 2000.
[56] Chicago Airport System Competition Plans, O'Hare International Airport, October 24, 2000.

opportunities will not continue, because international flights, which have first priority for use of these gates, are the fastest growing segment of passenger demand at O'Hare. Therefore, the opportunities to accommodate new entrants will further be impacted and the DOT's policy to encourage competition in the industry will be impeded.

Because of the existing terminal layout and available space, these existing inefficiencies and constraints are expected to continue, resulting in deteriorating levels of service afforded to the public as activity grows. The long-term needs for the terminal area at O'Hare include providing convenient access and minimizing travel distances from terminal facilities to the gate areas, and providing sufficient gates to accommodate existing and future demand. Each of these needs is intended to increase the quality of service afforded to the traveling public, by ensuring that passengers can transit between gates (connections) in a timely fashion.

Master Plan estimates for terminal area space are based upon the projected enplanements up through 2018. The estimated terminal area necessary to accommodate the projected demand ranges from about 6.9 to 7.4 million square feet. This is a net increase of approximately 2.5 million square feet, or 53 percent, over the existing terminal area.[57]

Increase Gate Availability and Efficiency

In busy periods, especially when flight schedules have been affected by delays, arriving aircraft are sometimes forced to wait for a gate to become available. In addition to causing further delays, a shortage of available gates can lead to the use of remote aircraft parking positions to load and unload passengers. Remote aircraft parking positions sometimes require the use of shuttle buses to move passengers between the aircraft and the terminal building, which provide poorer service for passengers and less efficiency for airlines. Overall, lack of gate availability can lead to passenger inconvenience, increased passenger travel time, more aircraft idling and emissions, higher costs, and increased aircraft activity into nighttime hours. These inefficient practices are likely to increase as demand increases due to the lack of adequate gate availability.

Additionally, O'Hare's existing gate configuration lacks the flexibility to efficiently accommodate the evolving aircraft fleet, which varies in length and, more importantly, wingspan. This affects the number of aircraft that can park at a terminal/concourse. Many of O'Hare's gates were designed for earlier generation narrowbody aircraft such as the DC-9/MD80, B-737-200/-300/-500, or B-727-200, with wingspans of 93 feet to 108 feet. Many of the newer, more efficient narrowbody aircraft that have largely replaced earlier generation narrowbody aircraft have somewhat larger wingspans than those being replaced. For example, newer generation Boeing 737s, such as the 737-800 and 737–900 variants (approximately 113-foot wingspan), in addition to the Airbus A320 family (approximately 111-foot wingspan) require more gate frontage than the aircraft they have replaced. From a widebody perspective, the B-777, which requires 200 feet of gate frontage, has replaced several aircraft with smaller gate footprints, including smaller B-767-300 aircraft where demand conditions warranted and older DC-10s that were retired.

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[57] O'Hare International Airport Master Plan, City of Chicago, February 2004.

As described earlier, a similar transition has taken place in commuter markets, where larger and more demanding 44- to 50-seat RJs have replaced smaller 19- to 30-seat turboprop aircraft. At the same time, smaller-capacity RJs are replacing larger jets on numerous routes. Consequently, more gates are often required to accommodate a given level of activity. Also, it should be noted that it is not always possible to reconfigure terminal gates designed for narrowbody jet aircraft to accommodate a larger number of RJs.

As described in this section, various trends in the fleet mix at O'Hare are occurring simultaneously. Because O'Hare has limited flexibility in its gate configuration, flights are increasingly being held at the departure airport or are being required to wait on the airfield after landing until an appropriate gate becomes available.

2.3.2.2 Provide Sufficient Supporting Infrastructure

In addition to airfield and passenger handling facilities, aeronautical users of O'Hare require a variety of services and supporting infrastructure. At present, O'Hare does not provide all of the infrastructure required to meet the needs of forecast aviation activity at desirable levels of service. Supporting infrastructure requirements reflect industry standard facility planning factors as well as historical practice at O'Hare. The following discussion summarizes the types of supporting infrastructure required to meet forecast passenger and aircraft activity levels.

Support/Ancillary Facilities

The support/ancillary facilities include, but are not limited to the following: cargo facilities, maintenance facilities, aircraft rescue and firefighting facilities (ARFF), fueling facilities, flight kitchens, warehouse/storage facilities, utility buildings and infrastructure (heating and refrigeration, electric, water, etc.), drainage facilities, air traffic control tower, navigational aids, lighting facilities, aviation office buildings, snow dump storage areas, deicing facilities, and guard posts.

Efficient Surface Access

These include on-Airport public roadways, on-Airport service roadways, off-Airport roadway improvements affected by the proposed project, public parking, employee parking, rental car facilities, commercial vehicle staging areas, railroad relocations, and public and airport transit system improvements associated with the propose project.

Currently, access points leading to the passenger terminal and other functional areas are located at the east and northeast perimeter. Consequently, airport users on the west and southwest of the airport must travel around the perimeter of the airport. To enhance convenience for airport users accessing O'Hare from the west and southwest, roadway access to O'Hare from the west should be provided. The O'Hare Modernization Act (OMA), related to the proposed expansion of O'Hare, was adopted by the Illinois legislature and signed into law by the Governor on August 6, 2003.[58] The following is quoted from the OMA:

> The Illinois General Assembly finds and determines:
>
> Public roadway access through the existing western boundary of O'Hare to passenger terminal and parking facilities located inside the boundary of O'Hare and reasonably accessible to that western access is an essential element of the O'Hare Modernization Program. That western access to O'Hare is needed to realize the full economic opportunities created by the O'Hare Modernization Program and to improve ground transportation in the O'Hare area. It is important to the State that the western access be constructed not later than the time existing 14R-32L is removed from service.

This law clearly sets forth a plan to deal with western access to O'Hare. The law does not provide specifics about the exact geographic location of the proposed access; it only indicates that the access will be on the west side of O'Hare, and outlines the timeframe for the construction of said access.

On the eastern end of the existing Elgin-O'Hare facility, an extension of the expressway is proposed to complete the facility's connection to O'Hare. According to the 2030 Regional Transportation Plan,[59] "the facility is also expected to provide a western access point to O'Hare's passenger terminals, relieving congestion to the east of the airport." This project is outside the scope of this EIS, therefore, the planning and construction of western access would have to be pursued by agencies other than the City or FAA. The most likely entity to lead some initiative related to western access to O'Hare (planning, alignment, design, environmental, etc.) would be the Illinois Department of Transportation (IDOT). The City of Chicago would, however, provide an appropriate "portal" or point of entry into O'Hare on the west side of the Airport.

In addition to the western access to O'Hare, the "western bypass" connecting I-294 south of O'Hare to I-90 northwest of the airport has been widely discussed. This project, like the extension of the Elgin-O'Hare expressway, is outside the scope of this EIS, and the planning and construction of a western bypass would have to be pursued by agencies other than the City or FAA. The most likely entity to lead an initiative related to a western bypass would be the Illinois State Toll Highway Authority (ISTHA). The City of Chicago has agreed to provide a land corridor for a western bypass within the western border of O'Hare.

Other Improvements

Previously approved projects at O'Hare, including the WGP; Capital Improvement Projects, such as ongoing reconstruction/rehabilitation projects at the Airport; and additional projects in the vicinity of O'Hare being undertaken by other entities, will mostly contribute, all or in part, to meeting the purpose and needs of the proposed action and will be addressed in the cumulative impacts section of this document.

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[58] O'Hare Modernization Act, Illinois Public Act 93-0450, August 6, 2003.

[59] 2030 Regional Transportation Plan – Recommended Plan, Chicago Area Transportation Study (CATS), October 2003.

2.4 SUMMARY

Section 2.1.2, Overview of Aircraft Delay, discusses four commonly used methods by which FAA measures delay. These metrics serve as tools which allow FAA to evaluate key airports and the impact that delays at those airports have on the entire NAS. For an airport such as O'Hare, where the historic percentage of connecting passengers has been 50 percent or more,[60] delays at O'Hare result in delays throughout the NAS because of the high number of operations and passengers served by O'Hare. For example, aircraft traveling through a congested O'Hare environment will produce further delays elsewhere in the system as those aircraft reach other airports. Such delays also impose severe penalties on those traveling to and from Chicago. In addition, these delays cause missed connections, rescheduled flights, and cancelled flights. O'Hare congestion also causes high altitude congestion as aircraft traveling on the same jet routes bound to and departing from O'Hare are slowed in response to delayed operations at O'Hare. In contrast, an equivalent level of delay in Fort Lauderdale, FL or in Phoenix, AZ would not have nearly the same level of effect on the NAS as a delay experienced at O'Hare. Because of O'Hare's significant role in the NAS and because of Chicago's historic role as a transportation hub, reducing or minimizing delays at O'Hare is vital to enhancing the capacity of the NAS.

Exhibit 2-6 shows aviation activity at O'Hare has increased dramatically over the last two years. The resurgence of aviation activity nationwide since the downturn following September 11, 2001, and the associated potential for increased congestion and delay in the NAS, prompted FAA's recent actions limiting scheduled operations (see **Section 2.2.4**, **FAA Orders Approving Limited Operations at O'Hare**) specifically targeting O'Hare delays. The market forces that have consistently made O'Hare one of the world's busiest and most congested airports are expected to continue. Both the current and forecast aviation demand in the Chicago market signal the need for immediate action to reduce congestion and delay. The EIS's for O'Hare, Gary/Chicago,[61] and South Suburban airports[62] are an early step in a lengthy process to address the current problems and prepare for the future needs. Although these improvements will collectively enhance the efficiency of the NAS, O'Hare is the number one problem related to delays within the NAS in the United States today.

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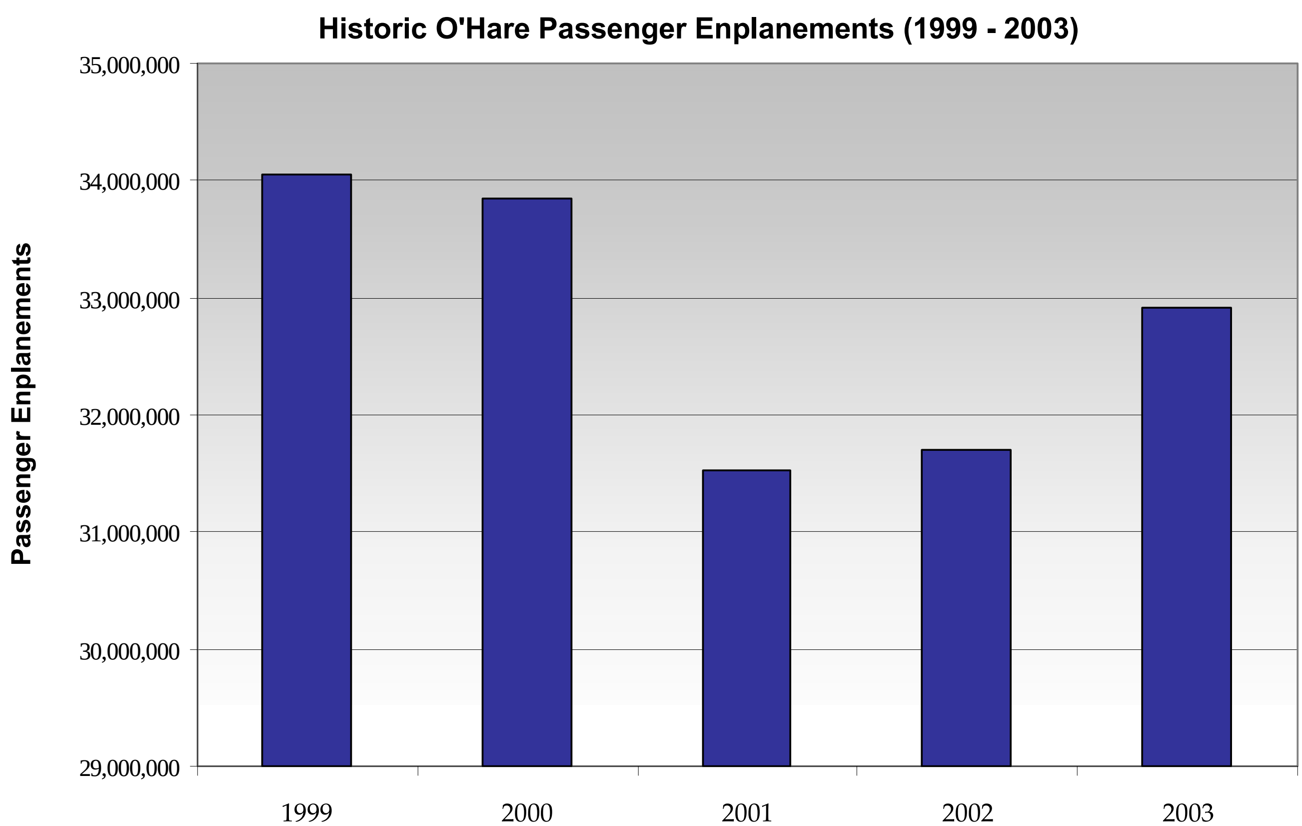
[60] Leigh Fisher Associates, Inc. [TPC] based on DOT databases: Passenger Origin and Destination Survey Database, T-100 Onboard Database, USDOT 298(c) Enplanement Database.

[61] The Notice of Availability for the Gary/Chicago International Airport Record of Decision, FAA, Federal Register, Volume 70, Number 56, March 24, 2005.

[62] Notice of Intent to Prepare a Tiered Environmental Impact Statement and Conduct Environmental Scoping for the Construction and Operation of Inaugural Airport Facilities by the State of Illinois for the South Suburban Airport, FAA, Federal Register, Volume 68, Number 208, October 28, 2003.



Source: FAA Air Carrier Activity Information System (ACAIS).

Historic Aircraft Operations & Enplanements for O'Hare 1999 - 2003

▶ Exhibit 2-6

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